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PREFACE TO BLM-DPS EDITION

On 11-16-78, we obtained a carbon copy of this report from Clifton Gray, Jr. of the CDMG in Los Angeles. He felt that it was the only copy in the possession of the CDMG at that time. Photocopying of this edition was completed at DPS on 11-21-78

According to Mr. Gray, the CDMG copy (kept in file folders) was dropped several years ago. The report was then paginated in the order it was picked up. While being photocopied at DPS, several errors were made in the paginated sequence. Neither these, nor the CDMG errors have been rectified as of this date. As a result, not all pages are in order. Some pages dealing with one commodity may be found within another section. Misplaced pages are probably near where they belong, so a short search may locate them. Some pages may be missing altogether, although no such omissions have been discovered as of this date.

Some years ago, according to Mr. Gray, all photographs and diagrams for this report were accidentally discarded.

This report was used to provide background information for reports in some G-E-M Resources field areas. When information could be verified or updated by DPS field work, it was added, dated, and initialed. NOT ALL VERIFICATIONS OR UPDATES HAVE BEEN NOTED HEREIN! Numbers written next to claim name are map index numbers.

This report has never been published. It cannot be replaced. PLEASE HANDLE IT CAREFULLY!

DPS G-E-M Resources
M.W. Shumaker
11-24-78

Riverside Co.

ABSTRACT

Riverside, the 4th largest county in California, comprises 7,179 square miles most of which is arid or mountainous. The population, more than 300,000 according to the 1960 census, is growing most rapidly in the west half of the county in the city of Riverside and its suburbs (adjacent to the urban and commercial complexes of neighboring, more populous coastal counties), and in the agricultural and recreational areas of the Coachella Valley.

Riverside County includes parts of the Peninsular Ranges, the Colorado Desert, the Transverse Ranges and the Mojave Desert.

CALIFORNIA DIVISION OF MINES AND GEOLOGY
Preliminary Manuscript

SUBJECT TO REVISION

Abstract

July 1960

The rocks exposed in the county range in age from Precambrian to Quaternary and represent a diversity of geologic events and processes. The Precambrian, Paleozoic, and most of the early Mesozoic rocks are intensely metamorphosed. Such rocks underlie parts of the Peninsular Ranges and most of the Transverse Ranges and mountains of the Mojave Desert. Intrusive, crystalline rocks of the Mesozoic Southern California Batholith underlie most of the Peninsular Ranges and parts of the desert ranges. Upper Mesozoic marine sedimentary rocks flank the northwest end of the Peninsular Ranges. Cenozoic marine and continental sedimentary rocks flank the north end of the Peninsular Ranges and underlie scattered desert areas. Cenozoic volcanic rocks are confined almost entirely to isolated areas in the Mojave Desert.

The largest, most active faults in Riverside County are the San Andreas, San Jacinto, and Elsinore which trend northwest across the western half of the county. The eastern half of the county is underlain by basin-range structure. Here, no evidence of recent movement on range-bounding faults was found, but, locally, late Tertiary gravel is faulted and deformed.

Status of Lands

Plate 1,
Figure 1_A and table 1 supply data pertinent to land use in Riverside County. Topographic maps of the U. S. Geological Survey and Army Corps of Engineers (indexed in fig. 1) show boundary details of national forests, parks, military reservations, monuments, Indian reservations and land grants.

Records of private lands and mining claims are maintained by the county assessor and recorder at the Court House in Riverside. A prospector seeking the status of land not clearly identified on published maps or in the field will need to resort to these records. Where claim markers are present it is not advisable to trust the absence or antiquity of claim notices and affidavits of assessment work as proof of abandonment. Such notices are subject to destruction by the elements, insects, rodents, and vandalism.

abstract

Review the file

Limestone, for the manufacture of portland cement, is mined from bodies of pre-Cretaceous metamorphic rock in the Crestmore Hills. At present this is the only such operation in Riverside County and is one of the oldest continuous mining operations in southern California.

Exploration and development of raw materials for the clay and glass-sand industries have continued in the Corona-Elsinore area.

Increases in urban and industrial growth are placing a growing demand on the sand and gravel resources of the county and encouraging a young roofing-granule and decorative stone industry.

INTRODUCTION

The early Spanish explorers, de Anza (1774, 1775-1776) and Garces (1776), found the area which now comprises Riverside County sparsely populated by Indians of the Shoshonean and Yuman groups. To this day evidence of the former Indian inhabitants remains in the form of petroglyphs, pictographs, dim trails and scattered artifacts. Since the building of the home of the first ^{with European origins} (white) settler, that of Leandro Serrano in Temescal Valley in 1824, the population of Riverside County has increased to a 1960 total of 300,000. This figure represents a 71 percent increase over the 1950 census, the largest numerical gain in any 10-year period in the history of the county.

Riverside County, the 4th largest in California, was formed in 1893 from parts of San Diego and San Bernardino Counties. The name was originally given to the city of Riverside in the year 1871 and subsequently adopted for the County. Riverside County has an area of 7,179 square miles, 44 percent of which is privately owned.

In 1960 this county ranked 8th in value of annual mineral production in California with a total of \$36,692,145. In the period 1893-1960 mineral production in Riverside County had a total reported value of \$504,170,144. Among those counties not reporting fuels, Riverside County has consistently ranked second only to San Bernardino County.

Cement, iron ore, sand and gravel, stone, and clay accounted for the bulk of the 1960 Riverside County mineral production.

Abstract *Revised 3*

Virtually all of the metaliferous lode deposits except iron ore are in or closely associated with old, inactive faults some of which originated during the intrusion of the Mesozoic Southern California Batholith. Recent faults such as the San Andreas, San Jacinto, and Elsinore are essentially unmineralized although they have given rise to hot springs and, locally, bound ground-water basins.

During the period 1891-1961, mineral commodities valued at about \$842 million were produced in Riverside County. A major part of this total comprises the combined values of iron ore, limestone for cement, sand and gravel, stone, gypsum, and clay.

Iron ore is mined, by Kaiser Steel Corporation, from an extensive replacement deposit in pre-Cretaceous rocks in the Eagle Mountains. This is the principal metal mine in the county and the largest known deposit of iron ore in the west. Riverside County has had a long history of both noble and base metal mining but until the development of the Eagle Mountain iron in 1948, such mining had been sporadic and small scale.

Acknowledgments

Much of the information included in this report was obtained in the field by the authors but important assistance was furnished by other members of the Division of Mines and Geology. Technical and historic data were gathered from both published and unpublished reports of the Division of Mines, U. S. Bureau of Mines, U.S. Bureau of Land Management and the U.S. Forest Service. Officials and employees of Riverside County were a generous source of information. The authors are grateful to these agencies and individuals and to the many people in local communities and in the vicinity of mines who volunteered useful information.

In general the authors confined their individual contributions to certain areas. Richard B. Saul covered the western, southern and eastern parts of the county except for the Elsinore, Corona and Riverside areas. Clifton H. Gray, Jr. supplied information on the Corona and Riverside areas, worked in the Little San Bernardino Mountains, and, in collaboration with James R. Evans, covered much of the western and southern parts of Joshua Tree National Monument. James R. Evans investigated

properties in the eastern half of Joshua Tree National Monument, an area which includes most of the Pinto and Eagle Mountains. The sections on clay and limestone are largely the work of Cliffton H. Gray. Iron, rare earths, and deposits of radioactive minerals were described by Evans except for several minor deposits of iron at the east end of the county.

Certain published reports warrant particular acknowledgment. The work of Rene Engel and Thomas E. Gay, Jr. on the Elsinore quadrangle (1959) supplied many property descriptions including those of the clay deposits near Alberhill and the most productive gold mine in the county, the Good Hope. Descriptions of gypsum deposits in the Little Maria Mountains by Ver Planck (1952) and in the Palen Mountains by Hoppin (1954) were of great value. Much of the historic data was drawn from property reports by former Division of Mines engineers and geologists, especially those by Reid J. Sampson and W. Burling Tucker. The completeness of the report was enhanced by unpublished data supplied by Charles W. Chesterman (descriptions of fluorspar, perlite, and nephrite deposits in the Orocopia, Chuckwalla, and Eagle Mountains), F. Harold Weber, Jr. (unpublished data on a tungsten deposit on Beauty Mountain), and Harold B. Goldman (data on sand and gravel deposits and processing plants).

Bennie W. Troxel, Clifton H. Gray, and Dr. Lauren A. Wright contributed their experience and constructive criticism to all phases of the work. Many useful suggestions were offered by other members of the Division of Mines and Geology.

Geography

Riverside County is bounded on the south by Imperial and San Diego Counties, the west by Orange County, and the north by San Bernardino County. The Colorado River forms the eastern boundary and Arizona lies further east. Because it includes parts of several geologic and physiographic provinces, Riverside County possesses a diversity of topography and climate.

The western third of the county has a combination of steppe and mediterranean climates with warm dry summers and mean annual rainfall ranging from less than 10 inches at lower altitudes to as much as 30 inches at high altitudes. The eastern two-thirds of Riverside County is desert, characterized by extreme annual temperature changes and less than 5 inches of precipitation.

The west third of the county is essentially a low plateau bordered on the west by the Santa Ana Mountains and the east by the San Jacinto and Santa Rosa Mountains. The desert areas to the east form a mountainous, gently-eastward-sloping plateau bordered on the west by the Coachella Valley and the east by the Colorado River.

SOIL SURVEYS

Soil is as much a part of the earth as the rocks from which it is derived and it is our most important basic natural resource. (Accordingly it is appropriate to include the following source data in this report.)

Soil and Land Classification Surveys in Riverside County

Adapted from a state-wide compilation by Walter W. Weir,
Department of Soils, University of California, Berkeley

Name of Survey	Date	Made by	Area Surveyed	Type of Survey	Scale of Maps
Soil Survey San Bernardino Valley	1904	1	portions of area around Riverside and Perris Valley	soil, semi-detail	1" = 1 mi.
Soil Survey Riverside Area	1915	1,2	western part of county	soil, detail	1" = 1 mi.
Reconnaissance Soil Survey Central Southern Area	1917	1,2	county west of desert	soil, recon	1" = 2 mi.
Soil Survey Indio Area	1903	1	lower portion Coachella Valley	soil, semi-detail	1" = 1 mi.
Soil Survey Coachella Valley	1923	1,2	344 sq. mi. S. portion of valley	soil, detail	1" = 1 mi.
Soil Survey Palo Verde Area	1922	1,2	423 sq. mi. Palo Verde Valley	soil, detail	1" = 1 mi.
Soils of Palo Verde Mesa	1946	2	40 sq. mi. Palo Verde Mesa	soil, detail	1" = 1/2 mi.
Soils of Portion of Palo Verde Valley (Between ree and River)	1947	2	about 60 sq. mi. along river	soil, detail	1" = 1 mi.

Name of Survey	Date	Made by	Area Surveyed	Type of Survey	Scale of Maps
Reconnaissance Soil Survey of San Diego Region	1915	1,2	strip 6 mi. wide along SW edge of county	soil recon	1" = 2 mi.
Mira Loma SCD	1914 ⁴¹	3	6,500 Ac NW corner of county	SCS, detail	1" = 1320'
Elsinore-Murrieta-Anza SCD	1953 (IP)	3	92,634 Ac SW portion Co.	SCS, detail	1" = 660'
Riverside-Corona SCD	1953 (IP)	3	2,540 Ac W. end of county	SCS, detail	1" = 660'
San Geronio SCD	1953	3	106,662 Ac N. central portion of county	SCS, detail	1" = 660'
San Jacinto Basin SCD	1953 (IP)	3	96,133 Ac W. central portion of county	SCS, detail	1" = 660'
Yucaipa Valley SCD	1952	3	south of Yucaipa	SCS, detail	1" = 660'
West End SCD	1953 (IP)	3	west of Riverside	SCS, detail	1" = 660'
Southwest Riverside County Reconnaissance	1945	3	288,000 Ac	SCS recon	1" = 660'
Santa Margarita Investigations Land Classification	1953	4	portion of Santa Margarita Ranch	LC recon	1/250,000
Chuckawalla Valley	1939	5	120,000 Ac	LC, semi-detail	---
Coachella Valley	1942-43	5	142,000 Ac	LC, detail	1" = 1 mi.
Soil-Geologic Survey	1943	6	areas in NF only	soil and geology recon	1/2" = 1 mi.

1 USDA U.S. Department of Agriculture, Soil Survey Division

2 UC University of California, Department of Soils

3 SCS U.S. Department of Agriculture, Soil Conservation Service

4 DWR Division of Water Resources, Department of Public Works

5 USBR U.S. Bureau of Reclamation

6 CFRES California Forest and Range Experiment Station, Forestry Bldg., University of California, Berkeley

--- Information not currently (1954) available

Information made available to the agency reporting.

Reference copies of local soil surveys are on file in the office of the University of California Farm Advisor and your local Public Library.

Some of the published soil surveys are still available. Inquiries may be mailed to:

Agricultural Publications
207 University Hall
University of California
Berkeley 4, California

(Explain your need. A limited number of surveys are available and not all requests can be granted.)

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— MINING DISTRICTS —



Mining Districts

In the western mining camps, mining districts were the result of individuals "----finding themselves beyond the pale of the law and being so uncomfortable in that nakedness that they concerted to erect a system of law and a machinery of government." (Caughey, 1948, p. 225).

Where competition for mineral ground was keen, mining district boundaries were apt to be well defined and well administered, one of the chief functions being the recording of claims. Conversely, in areas such as Riverside County, where gold and water were less abundant, mining districts appear to have been less formal and to have acquired little or no legal machinery. When disputes arose in such areas they could be settled under federal statutes. Mining districts were not necessary to the staking of claims (Ricketts, 1931, p. 176) but a district office afforded the miner a local authority.

The various areas in Riverside County referred to at one time or another by prospectors or authors of technical reports as "districts" are shown on plate _____. With the possible exception of the Temescal and Taquitz (Kenworthy) districts no evidence was found that much in the way of formal records were kept in these areas. Early

reports use different, and sometimes conflicting, names for similar areas. The Ironwood district, for example, once included the eastern third of the county, an area including 8 smaller districts the names of which have been used either in the literature or on claim notices filed with the county authorities. The U. S. Geological Survey has used mining districts for "convenience of reference" (Hill, 1912, p. 114) including some of those shown on plate /.

The offices of the county assessor and recorder, both of which are in the courthouse in Riverside, receive and record notices of claims, records of official surveys, and affidavits of annual assessment work. Old or newly devised district designations are of little service to the accuracy of their records as a means of specifying location and afford the locator a poor legal base for his claim.

The recording of a mining claim should be done as nearly as possible with reference to the "Public Land Survey" system. The topographic quadrangle maps published by the U. S. Geological Survey show the lines of this coordinate system and serve as a valuable aid to locators (fig. ___). The "Public Land Survey" has not yet been completed in some remote or arid areas. In such areas, Mineral or Location Monuments have sometimes been established to afford permanent reference points (Saul, 1922). These markers should be used where available.

G E O L O G Y

General Features

Riverside County lies athwart a mosaic of natural provinces (fig. ___/) which from west to east, are: (1) the Peninsular Ranges, (2) the Colorado Desert, (3) the Transverse Ranges, and (4) the Mojave Desert.

In Riverside County the Peninsular Ranges province comprise the northwest-trending Santa Ana, San Jacinto, and Santa Rosa Mountains and include the highest point in the county, San Jacinto Peak, elevation 10,805 feet. The Colorado Desert province includes Coachella Valley, Salton Sea, Mecca Hills and Indio Hills. This is the lowest area in the county, the surface of Salton Sea being 235 feet below sea level. The Transverse Ranges province comprises the Little San Bernardino, Pinto, Hexie, Cottonwood, and Eagle Mountains; these are arid and rugged mountains ranging in altitude from 3,000 to 5,400 feet. The Mojave Desert province is an area of rugged, arid mountain ranges separated by broad alluvial plains. The ranges are the Croccopia, Chuckwalla, Cockscomb, Granite, Palen, McCoy, Little Maria, Big Maria, Arica, Mule, and Riverside Mountains.

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The western half of the county is crossed by 3 major parallel, northwest-trending, right-lateral fault zones -- the San Andreas, San Jacinto, and Elsinore. The most extensive and famous of these is the San Andreas fault, which parallels the eastern margin of the Colorado Desert. The San Jacinto fault lies farther west and bounds the southwest side of the Santa Rosa Mountains (fig. ___), Thomas Mountain, and the northwest margin of the San Jacinto Mountains. The Elsinore fault is still farther west and is roughly parallel to the southwest boundary of the county where it has formed the shallow, trench-like depression occupied, in part, by Lake Elsinore.

The eastern half of Riverside County contains much local evidence of faulting and faults appear to bound many of the mountain ranges, however, there is no such physiographic evidence of displacement as that of the rifts of the San Andreas, San Jacinto and Elsinore faults in the western half of the county.

Descriptive Geology

The geologic formations in Riverside County are described on plate __/, and, in addition, some of their known or probable relationships are shown. The ages of these rocks range from Precambrian(?) to Quaternary. Rocks of pre-Cenozoic age comprise the largest area of exposed bedrock in the county, an area which includes most of the desert ranges, the east end of the Transverse Ranges and most of the northern end of the Peninsular Ranges. Exposures of rocks of Cenozoic age are on the north and northwest flanks of the Peninsular Ranges, the margin of the Colorado Desert and in scattered areas in the desert ranges.

At no place in the county do rocks representing all the geologic periods occur in an unbroken sequence. A composite geologic column (plate __/) illustrates the incompleteness of the record and uncertainty of some age determinations. The older sedimentary rocks are deformed, and with few exceptions, metamorphosed. The Cenozoic rocks are well described and dated but comprise a diversity of local sections.

Precambrian(?) Rocks

Rocks of Precambrian(?) age include the Orocopia Schist, Pinto Gneiss and Chuckwalla Complex.

The Orocopia Schist was described by Miller (1944, p. 21). This formation consists of an undetermined thickness of muscovite and biotite schists interlayered with quartz-feldspar, muscovitic, calcareous and quartzitic schists, and a few thin units of both pure and sandy limestone. Miller suggested a correlation between the Orocopia Schist and the Pelona Schist of Los Angeles County. In Riverside County the Orocopia Schist is exposed only in and near the San Andreas fault zone where ^{it}(they) underlie^S the west end of the Orocopia Mountains and several small areas along the northeast slope of the Mecca Hills.

Thin lenticular bodies of manganese oxides are present in the Orocopia Schist. Several of these have been prospected and a small tonnage of material shipped from one claim. In addition, the Orocopia Schist contains an undetermined but probably small proportion of talc-actinolite rocks, one deposit of which has been prospected.

The Pinto Gneiss was named and described by Miller (1938, p. 424-426) on the basis of rocks exposed in the Pinto Mountains. Additional mapping by Rogers (1954, map sheet no. 24) and Babcock (1961, unpublished thesis) has extended the known area of outcrop westward to the Lost Horse Valley area. This lithologic unit is a heterogeneous mixture of metasedimentary and meta-igneous rocks. In the original description Miller implied a Precambrian age for the Pinto Gneiss by suggesting an origin similar to that of rocks of probable Precambrian age in the western San Gabriel Mountains (Miller, 1934, p. 63).

The Pinto Gneiss is the host rock of gold-bearing quartz veins in the Pinto Mountains and Lost Horse Mountain areas and, in Music Valley, contains deposits of rare earth minerals.

The Chuckwalla Complex was named by Miller (1944, p. 16) from extensive typical exposures in the Chuckwalla Mountains. This complex comprises varyingly metamorphosed diorite, granodiorite and granite with minor proportions of metasedimentary rocks and migmatite. Rocks of the Chuckwalla Complex are exposed in the Cottonwood, Little San Bernardino Orocopia, Eagle, Chuckwalla, Little Chuckwalla, Mule and Big Maria Mountains,

*... a broad pediment along the
west side of the area shown above.*

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Miller (1944, p. 20-21) regarded the Chuckwalla Complex as early Precambrian in age because of its similarity to other rocks in southern California, which, like it, underlie strata of known or probable Paleozoic age and appear to be older than other less intruded and altered pre-Paleozoic rocks.

The Chuckwalla Complex is host to numerous quartz veins some of which have yielded gold, and copper, tungsten, lead and silver bearing minerals.

Paleozoic Rocks

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Rocks considered to be of Paleozoic(?) age are widely distributed in Riverside County. At the west end of the county rocks identified as Paleozoic by Larsen (1948, p. 16), are exposed in an irregular mosaic of north-northwest-trending pendants in the Mesozoic igneous rocks of the Peninsular Ranges. Here these metasedimentary rocks consist of coarsely-crystalline, quartz-mica schists with local concentrations of amphibole andalusite, sillimanite, garnet and epidote. The section contains, in addition, a thick series of quartzite beds and, (in the Jurupa, San Jacinto and Santa Rosa Mountains) limestone. Where exposed south of Domengoni Valley this section has been estimated to be from 12,000 to 13,000 feet thick (Larsen, 1948, p. 17; Schwarcz, 1960, p. 1969).

Uncertainty as to the age of these rocks arises from the fact that they are strongly metamorphosed, having been deformed, and later, intruded by igneous rocks of the southern California batholith. Virtually all fossil evidence has been destroyed, save for a reported occurrence of a Paleozoic coral near Winchester (Webb, 1939, p. 198-201), and some objects of doubtful origin and age found in the Palm Canyon Complex between Bradley and Cathedral canyons near Cathedral City (Miller, 1944, p. 25). These rocks generally have been correlated with Paleozoic sections in nearby regions on the basis of lithologic similarity (Jahns, 1954, chap. II, cont. 3, p. 33), the known age range of overlying sedimentary and volcanic rocks, and the intrusive rocks of the southern California batholith (Larsen, 1948, p. 18, 22, 136). Schwarcz states (1960, p. 1369) that Larsen's "Paleozoic schist" is conformable on the Bedford Canyon Formation (Triassic-Jurassic). Larsen believed that the Paleozoic rocks were in fault contact with the younger Bedford Canyon (Larsen, 1948, p. 17).

Although the Paleozoic(?) rocks exposed in the western half of the county contain gold-bearing quartz veins in some localities and are associated with magnesite near Winchester, the principal economic value of these rocks lies in the limestone units. One limestone body is being mined at Crestmore. Others in the San Jacinto, Santa Rosa and Jurupa mountains have been prospected and mined for limestone, and locally, are the host rock for tungsten minerals.

In the eastern half of Riverside County sedimentary rocks of Paleozoic(?) age comprise the Maria Formation, which was described by Miller (1944, p. 25-28). It consists of gneiss, quartzite, schistose carbonate rock, green schist, gypsum and altered limestone. These rocks are exposed in the Pinto, Eagle, Palen, Little Maria, Big Maria, Arica and Riverside Mountains. In all of these localities the Maria Formation has been deformed, faulted and generally metamorphosed. It is difficult to measure the true thickness or sequence of units in the formation. Ver Planck (1952, pl. 3) suggests a thickness of as much as 3,000 feet for exposures of the Maria Formation in the Little Maria Mountains. In the nearby Big Maria Mountains, Hamilton (1960) has described deformation and repetition by faulting in these rocks.

Miller (1944, p. 28) assigned a Paleozoic age to the Maria Formation because of an apparent unconformity between it and the subjacent Chuckwalla Complex and because of crinoidal remains identified to be "of Paleozoic age, and possibly Silurian". Lee (1908, p. 15) noted similar rocks at several localities in northwestern Arizona and considered them to be of probable Precambrian age.

The chief economic importance of the Maria Formation lies in the extensive bodies of iron ore contained in the Eagle Mountains section, and gypsum present in large tonnages in the Palen, Little Maria, Big Maria and Riverside Mountains.

Gold-and-copper-bearing quartz veins of small extent are exposed in and near the various outcrops of the Maria Formation. In the Little Maria Mountains these rocks are host to manganese and fluorite deposits. Wollastonite-rich, altered limestone has been used as decorative rock and tested for the manufacture of rock wool.

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Some of the igneous rocks in the Maria Mountains region are of possible Paleozoic age (Miller, 1944, p. 31). A body of granite porphyry at the north end of the McCoy Mountains appears to be overlain unconformably by the sediments of the McCoy Mountains Formation thought by Miller (1944, p. 51-52) to be of Late Paleozoic or early Mesozoic age. Fault zones in this porphyry have been extensively mined for manganese oxides.

Mesozoic Rocks

The Mesozoic rocks of Riverside County comprise the metasedimentary rocks of the Triassic(?) - Jurassic Bedford Canyon Formation; the Jurassic(?) Santiago Peak Volcanics; probably all or part of the McCoy Mountains Formation; the igneous rocks of the late Jurassic- to mid-Cretaceous southern California batholith and the more isolated but probably related White Tank Monzonite and Cockscomb Granodiorite; the upper Cretaceous sedimentary rocks of the Trabuco and Ladd Formations.

Possibly the oldest Mesozoic rocks in Riverside County are those of the McCoy Mountains Formation. This formation has not yet been adequately described or studied but it appears to consist of mudstone, siltstone, calcareous sandstone, coarse arkosic grit and arkosic conglomerate, pebbly mudstone, chert, and volcanic eject^As characteristic of a marine eugeosynclinal environment. ^AThe total thickness of this section has not been measured. Miller (1944) who named and briefly described these rocks, suggested a thickness of "many thousands of feet". The McCoy Mountains Formation underlies all but the northern ridge of the McCoy Mountains, most of the Palen Mountains, the southern one-third of the Cocke-comb Mountains, and possibly parts of the Maria, Mule and Riverside Mountains. The age of the McCoy Mountains Formation (late Paleozoic or Triassic) was suggested by Miller (1944, p. 51-52) on the basis of work by Hazzard, Gardner and Mason (1938) and his own observations.

Quartz veins, containing gold, and copper and lead minerals cut the McCoy Mountains Formation at scattered localities. At the south end of the Palen Mountains these rocks are host to ^{small} a small iron deposit and, along one shear zone, are altered to talc. At the south end of the McCoy Mountains thin crusts and films of secondary uranium minerals are exposed in several shallow prospects. Some of the dense volcanic rocks, which range in color from pink through various shades of gray and green, may eventually prove useful for decorative purposes. Iron-stained and coated quartzite cobbles, derived from the conglomeratic units of the McCoy Mountains Formation have been gathered from the surface of the alluvium near Palo Verde and marketed as decorative rock.

Other early Mesozoic metasedimentary rocks are exposed on the east slope of the Santa Ana Mountains and east and southeastward to Domengioni Valley. These rocks, the Triassic-Jurassic Bedford Canyon Formation, consist of slate, argillite, quartzite and a few thin lenses of limestone in the Santa Ana Mountains and similar but more metamorphosed rocks to the east and southeast. The Bedford Canyon Formation was once thought to be largely of Triassic age (Larsen, 1948, p. 18-19) but subsequent work (Silbering and others, 1961, p. 1746-1748) has indicated a Jurassic age for much of this formation, at least in the northern Santa Ana Mountains. The Bedford Canyon Formation is only sparingly fossiliferous and those forms that have been recovered are blemished by metamorphism. The total thickness of these rocks is uncertain. Larsen (1948, p. 22) states that the base is not exposed and the top of the formation is an erosion surface.

The rocks of the Bedford Canyon Formation have been mined in a small way for flagstones and building stone and some have been ground for roofing granules (Engel and others, 1959, p. 103).

The Jurassic Santiago Peak Volcanics intruded and flowed over the deformed and eroded Bedford Canyon Formation. The Santiago Peak Volcanics were named by Larsen (1948, p. 23) who described them as unmeasurable but probably a many thousand-feet-thick accumulation of mildly metamorphosed volcanic rocks, mostly agglomerate, that include some sediments. In Riverside County this formation is confined to scattered outcrops in the Santa Ana Mountains and one small area north of Alberhill (Larsen, 1948, pl. 1).

Larsen (1948, p. 23-24) considered the Santiago Peak Volcanics to be of Jurassic age because they overlie the Bedford Canyon Formation unconformably and are intruded by the crystalline rocks of the southern California batholith.

South of Corona, on the northeast slope of the Santa Ana Mountains, deeply altered rocks of Santiago Peak Volcanics have been quarried for contained gypsum.

Another rock unit, the Temescal Wash Quartz Latite Porphyry, is probably of Jurassic age (Larsen, 1948, p. 36). This unit underlies several square miles in the hills southeast of Corona and is extensively exposed in the Estelle Mountain area north of Alberhill.

At a quarry in Temescal Canyon the Temescal Wash Quartz Latite Porphyry has been mined since 1888; first for paving materials and, since 1947, for roofing granules (Gray, 1961, p. 93).

The rocks of the Southern California batholith are the most extensively exposed bedrock units in Riverside County. They range in composition from gabbro to granite. The average composition is that of a quartz diorite. The intrusive sequence was: Gabbro, quartz diorite, granodiorite, then granite (Larsen, 1948, p. 137, 138-139).

The southern California batholith comprises the bulk of the Peninsular Ranges the northern end of which underlies the west half of the county. Plutonic igneous rocks of similar age (Jurassic to Cretaceous) are present in the Little San Bernardino, Pinto, Eagle, Cockscomb, Chuckwalla and Orocopia Mountains. One of these, the White Tank Monzonite, which underlies parts of the Pinto, Eagle, Orocopia and Chuckwalla Mountains, has been dated as Cretaceous in age (Jaffe and others, 1959, p. 88).

The Fargo Canyon Diorite, in the Little San Bernardino Mountains, has been considered of probable late Jurassic age (Miller, 1944, p. 60) on the basis of field relationships, and the Cockscomb Granodiorite is of probable Mesozoic age (Miller, 1944, p. 63) because it intrudes the McCoy Mountains Formation. Thus, the central desert area of Riverside County was intruded by plutons which were rough synchronous, if not contiguous, with the southern California batholith of the Peninsular Range Province.

Much of the evidence of the age of the southern California batholith is outside Riverside County but in the Santa Ana Mountains components of this igneous complex intrude the Triassic-Jurassic Bedford Canyon Formation and the Temescal Quartz Latite Porphyry and are overlain unconformably by sedimentary rocks of late Cretaceous age.

Most of the metal-bearing vein deposits of Riverside County lie in or are closely associated with the rocks of the southern California batholith. Dikes of gray- to green, fine-grained rock of dioritic composition are common in the eastern part of the county. Such dikes cut rocks as young as the White Tank Monzonite and were observed to be a source of copper minerals in several deposits in the Maria and Riverside Mountains. These dikes are probably late Mesozoic in age. Miller (1944, p. 32) suggested that the replacement iron ore deposits in the Eagle Mountains are of late Mesozoic age.

In the west half of the county, pegmatite bodies, associated with the rocks of the southern California batholith, have been a source of quartz, feldspar, and gems and are a potential source of beryllium minerals. In addition, the various rocks of the batholith have been used as decorative and structural material, rip-rap, and, where decomposed, as road base.

In Riverside County, Upper Cretaceous sedimentary rocks comprise the Trabucco and Ladd Formations. These rocks are exposed in a narrow belt along the northeast slope of the Santa Ana Mountains.

The Trabucco Formation consists of 600 feet of non-marine(?) conglomerate which lies unconformably on or is in fault contact with the previously described older Mesozoic rocks.

The Ladd Formation is made up of 5,400 feet of fossiliferous, marine conglomerate, sandstone, siltstone and shale. The upper one-third of this formation consists of a 1400-foot sandstone called the Baker Canyon Member, and an overlying silt- to silty clay called the Holz Shale.

Woodring and Popenoe (1942, p. 170) consider the Trabucco Formation to be of early Late or late Early Cretaceous age. The same authors described the Ladd Formation and assigned a Late Cretaceous age (Woodring and Popenoe, 1942, p. 170) on the basis of marine fossils.

The Ladd Formation yields red-burning clay in the Wardlow and Mabey Canyon area about 3 1/2 miles southwest of Corona (Gray, 1961, p. 78-80). The clay is used in the manufacture of common clay products.

Tertiary Rocks

Rocks of Tertiary age are exposed in a few restricted and widely separated areas in Riverside County.

In the west half of the County the Tertiary rocks consist of the Silverado Formation (Paleocene), Santiago Formation (Eocene), Vaqueros-Sespe Formations (Eocene to Miocene), Topanga Formation (Miocene), Puente Formation (Miocene) and undifferentiated Pliocene sedimentary rocks.

The Silverado Formation is made up of approximately 2,000 feet of non-marine and marine clay, clayey sandstone, lignite, and pebble conglomerate. These rocks were originally assigned to the Martinez Formation (Dickerson, 1914, p. 263; English, 1926, p. 19 Sutherland, 1935, p. 76) of "lower Eocene" age on the basis of their relationship to older rocks and fossil evidence. Woodring and Popenoe (1945) proposed the name Silverado.

The Silverado Formation is exposed in a narrow belt northeast of the Elsinore fault parallel and adjacent to the foot of the northeast slope of the Santa Ana Mountains (Gray, 1961, p. 24, pls. 1,3). In the Alberhill area and south of Corona this formation is quarried for clay and glass sand (Gray, 1961, p. 23-29).

The Santiago Formation consists of a band of marine Eocene (?) sandstone, siltstone, and cobble conglomerate, ranging from 200 to 800 feet in width which extends for about 1 3/4 miles eastward from Santa Ana Canyon parallel to the north slope of the Santa Ana Mountains (Gray, 1961, p. 29, pl.3). The age of this formation is based on somewhat indefinite fossil evidence (Gray, 1961, p. 29). It is conformable on the Silverado Formation and overlain conformably by the undifferentiated Vaqueros and Sespe Formations.

The Vaqueros and Sespe Formations Undifferentiated are sparsely fossiliferous, maroon, red buff, gray and grayish-green coarse sandstone, conglomerate, and a minor amount of siltstone. These rocks are exposed in the area south of the junction of Bedford Wash and Temescal Wash and in a discontinuous belt east of Santa Ana Canyon and south of Prado Dam (Gray, 1961, pls. 1,3).

Dickerson (1914), English (1926), Leel and Corey (1932, p. 51-60), Woodring and Popenoe (1945), Woodford and others (1954, p. 59), and Gray (1961, p. 29-31) have contributed to the description of the Vaqueros and Sespe Formations and their age and relationship in the Santa Ana Mountains. The Vaqueros and Sespe Formations Undifferentiated have a maximum exposed thickness of 2,300 feet in Riverside County. These rocks are reported to be conformable on Paleocene sandstone, unconformable on the Santiago Formation and unconformably overlain by the Topanga Formation (Gray, 1961, p. 30-31).

In Riverside County rocks assigned to the Topanga Formation are exposed in an area about one-half of a square mile in extent in the hills south of El Cerrito Village about 3 miles southeast of Corona (Gray, 1961, pl. 1). Here this formation comprises buff and brown siltstone and shale with subordinate sandstone and conglomerate. Some of the shale is diatomaceous. These rocks are probably 750 to 1000 feet thick. Their late middle Miocene age is based on fossil evidence and primarily on microfossils (Gray, 1961, p. 31).

At the above locality the Topanga Formation overlies the Silverado Formation unconformably and its upper boundary has been removed by erosion.

The Puente Formation, which in the normal Santa Ana Mountains section lies unconformably on the Topanga Formation, was originally described and named by Eldridge and Arnold (1907). Subsequent workers (English, 1926, p. 33-38; Woodford and other^S, 1944) divided the Puente Formation into three members: lower shale and sandstone; middle sandstone; and upper shale, conglomerate and sandstone. Later work by Schoellhamer and others (1954) and Gray (1961) has shown the utility of using four members in the southeastern Puente-Chino Hills and in the Santa Ana Mountains. The members are: The La Vida Shale, Soquel Sandstone, Yorba Shale, and Sycamore Canyon. Gray (1961, p. 34, pls. 1,3,4), in mapping the Corona-Prado Dam area, used a basal "undifferentiated unit in addition to the four members.

All of these units except the La Vida Shale are exposed in Riverside County. They are fossiliferous marine sedimentary rocks. The Puente Formation underlies scattered areas from Temescal Canyon northwest to Santa Ana Canyon in a rough arc around the northeast end of the Santa Ana Mountains.

The Puente Formation Undifferentiated consists of about 1000 feet of siltstone, shale, diatomite, limy beds and minor sandstone and conglomerate.

The Soquel Sandstone Member is 700 feet of sandstone, conglomerate and a minor amount of siltstone. Where its base is exposed, west of the county, it is conformable on the La Vida Member. It is in gradational contact with the superjacent Yorba Member.

The Yorba Member comprises about 1200 feet of massive to fissile siltstone interbedded with fine sandstone. It grades upwards into the overlying Sycamore Canyon Member.

The Sycamore Canyon Member is made up of approximately 2700 feet of coarse sandstone and conglomerate with interbedded siltstone.

In the Prado Dam area the axis of a syncline (Arena Blanca Syncline) contains about 3,000 feet of marine sedimentary rocks of Pliocene (?) age (Gray, 1961, p. 36, pl. 3) exposed in a belt of about 1 1/2 miles wide at the southeastern end of the Puente-Chino Hills. These rocks are white sandstone, conglomerate, and sandy silt and shale. They are in gradational contact with the underlying Puente Formation. The Pliocene (?) age of these rocks is in doubt because the supporting fossil evidence is inconclusive.

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Fossiliferous, continental and lacustrine beds of Pliocene and Pleistocene age underlie badlands northwest of the San Jacinto Mountains and in the Bautista Creek-Hemet Valley areas. These rocks comprise the Mount Eden Formation (Pliocene), San Timoteo Formation (Pliocene) and the Bautista Beds (Pleistocene).

The Mount Eden Formation was originally named the Eden Beds by Frick (1921). Because this name was found to be preoccupied, the name Mount Eden Formation was proposed by Fraser (1931, p. 512). The Mount Eden Formation includes a lower, generally coarse grained red-bed unit overlain by interbedded gray, buff and greenish, arkosic sandstone, sandy shale and shaly siltstone. Fraser (1931, p. 512, 513) estimated the thickness of the basal red beds to be 1800 feet and the overlying sandstone and shale 1500 feet. The Mount Eden Formation is exposed in the area of Potrero Creek and its tributaries. The Pliocene age of the Mount Eden Formation is based on fossil vertebrate faunas described by Frick (1921), and plant remains (Axelrod, 1937).

The San Timoteo Formation consists of an unknown thickness of alluvial silt, sand, and coarse gravel underlying the San Jacinto-Moreno and San Bernardino valleys and the intervening divide which extends about 18 miles northwest from the foothills of Mount San Jacinto. This formation overlies the Mount Eden Formation unconformably. No contact between the San Timoteo Formation and the younger Bautista Beds has been described. The Pliocene age of the San Timoteo Formation is based upon vertebrate fossils (Frick, 1921).

The Bautista Beds underlie the Bautista Creek badlands which lie north of Bautista Creek and form both banks of the San Jacinto River and Poppet Creek in an area of about 36 square miles 7 miles east of Hemet. Several smaller exposures include Park Hill near Hemet, a six-square-mile area in the Bautista Creek watershed, a three-square-mile area in Cactus Valley, and a ten-square mile area at the southeast end of Hemet Valley (Fraser, 1931, map). This formation was named by Frick, (1921, p. 290). It is made up of poorly indurated silty clay, shale, sandstone and minor conglomerate and calcarious tuff, estimated (Fraser, 1931, p. 515) to be 1500 to 2000 feet thick. The Bautista Beds have yielded a rich Pleistocene vertebrate fauna (Frick, 1921).

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Along the northeast side of the Coachella Valley the trace of the San Andreas fault is marked by several groups of low, deeply eroded hills, which include the Bat Cave Buttes, Mecca Hills and Indio Hills. In these hills, soft sedimentary rocks of the Mecca and Imperial Formations, the Canebrake Conglomerate, the Palm Spring Formation and the Ocotillo Conglomerate are exposed (Dibblee, 1954).

The Mecca Formation was described by Dibblee (1954, p. 24) as "essentially a basal conglomerate of granitic and metamorphic debris." It is unconformable on the eroded Precambrian rocks exposed in the Orocochia Mountains and overlies the Dos Palmas Rhyolite of Miocene (?) age. In addition to its typically conglomeratic character the Mecca Formation grades laterally and upward into sand, sandstone, and clay. It has an estimated total thickness of as much as 1,000 feet (Dibblee, 1954, fig. 3). The Miocene(?) age of the Mecca Formation is based on its stratigraphic position. It is overlain unconformably by the Imperial and Palm Spring formations.

The Imperial Formation was named by Woodring (1931). It is exposed in the northwestern Indio Hills. This formation appears to comprise as much as 300 feet of fossiliferous, marine clay and possibly some sandstone. It is unconformable beneath the Palm Spring Formation and the Ocotillo Conglomerate.

The Palm Spring Formation (Woodring, 1931) is made up of 3,300 to 4,800 feet of nonmarine(?), arkosic sandstone grading upward into increasingly clay-rich beds and including, in its upper 1,500 feet, thick beds of red and green silty claystone. A ~~(paired valves of a)~~ ^(paired valves) specimen of the marine pelecypod genus Rangia ^(was) ~~(were)~~ found by the author in a clay unit in the upper part of the Palm Spring Formation about 4½ miles east of Thermal.

The Palm Spring Formation grades northeastward into the Canebreak Conglomerate, described by Dibblee as a marginal facies, 0 to 3,000 feet thick (1954, p. 25, fig. 3).

The Palm Spring Formation and Canebrake Conglomerate are overlain unconformably by the Ocotillo Conglomerate. This is an accumulation of granitic and metamorphic debris which forms coalescing alluvial fans derived from the Orocochia and Little San Bernardino Mountains. This conglomerate was described by Dibblee (1954, p. 25) who estimated its thickness to range from 0 to 2,500 feet.

About 300 feet of alluvium, terraces and lake beds cap the Coachella Valley section. The lake beds were named the Lake Coahuila Deposits by Tarbet and Holman (1944, p. 1782) after Lake Coahuila, a former fresh water body, the shore line of which is still visible along the ^{west}(east) side of the valley.

Some exposures of clay-rich units in the Palm Spring Formation have been prospected for clay. Alluvial deposits along the southwest margin of the Mecca and Indio Hills currently are being quarried for sand and gravel.

In the arid ranges of the Mojave Desert in the southern and eastern part of Riverside County, the Cenozoic era is represented by 4,800 feet of marine sediments of Eocene age, ^{marine} 5,000⁺ feet of nonmarine Miocene sedimentary and volcanic rocks and marine or brackish water marl, travertine, clay, and sandy gravel, of Pliocene to Pleistocene age. There are abundant late Quaternary alluvial, lake, and eolian deposits.

The Eocene rocks have been described by Crowell and Susuki (1959) and named the Maniobra Formation. They state (1959, p. 591): "The Maniobra formation, discovered recently in the Oroccopia Mountains north of Salton Sea, contains a fauna of mullusks, orbitoids and small foraminifera. These marine rocks constitute about 4800 feet of interbedded sandstone, siltstone, conglomerate, and breccia which were laid down near a rugged shore line."

The Maniobra formation is discontinuously exposed in a narrow, northwest-trending belt about 12 miles long and 2 miles wide in the north-central Oroccopia Mountains.

Approximately 5,000 feet of non marine, Miocene strata overlie the Maniobra Formation. These strata may be equivalent, at least in part, to the Mecca and Imperial Formations exposed in the Coachella Valley (plate ___/). The volcanic rocks exposed in the Oroccopia Mountains might be roughly synchronous with the Dos Palmas Rhyolite to the west and the volcanic rocks exposed along the south flank of the Little Chuckwalla Mountains and at the south end of the Mule Mountains to the east.

Bodies of quartz latite and rhyolite are common in various areas. Miller (1944, p. 65-66) assigned a probable early Tertiary age to a system of quartz latite dikes most prominently exposed in the Desert Center area. One such dike forms the "spine" of a long northeast-trending ridge just south of Desert Center. It is possible that some of the dikes cutting the Chuckwalla Complex in the Chuckwalla Mountains at Graham Pass are Tertiary in age.

Miocene(?) volcanic rocks flanking the south slope of the Chuckwalla and Little Chuckwalla Mountains comprise an undetermined thickness of andesite, rhyolite and basalt flows. cursory examination of the sequence suggests that the andesite and rhyolite were the earlier having culminated in flows of perlitic obsidian. The basalt appears to have followed a period of erosion for, in at least one locality, it is separated from the underlying obsidian by some tens of feet of alluvial material. The volcanic rocks exposed in the Mule Mountains are, as far as was observed, the older rhyolitic material.

The south slope of the Chuckwalla Mountains, and especially the Coon Hollow area in the Mule Mountains, are noted collecting localities for cryptocrystalline varieties of quartz in the form of septarian nodules (thunder eggs), amygdules, and as fissure fillings.

The youngest volcanic rocks in Riverside County, possibly as young as early Pleistocene, are olivine basalt flows and interlayered basaltic sands, totaling 500 to 700 feet in thickness, which form small mesas in the Eagle Mountains (Miller, 1944, p. 68-69).

Low on the slopes of the Big Maria, Little Maria and Riverside Mountains deposits of calcareous marl, travertine, and lime-cemented alluvium comprise what appears to be remnants of a Pliocene(?) marine or saline lake deposit (Hamilton, 1960, p. 276-277). These deposits are as much as 800 feet above sea level. In some exposures the material is composed of a ccquina of calcareous algae, barnacles, and pelocypods. Some slopes are buttressed by masses of dense travertine as much as 50 feet thick (fig. ___/), others are covered by thin veneers. A small tonnage of marl was quarried from one deposit at the south end of the Maria Mountains but no record of its sale or use was found. Locally, accumulations of manganese oxides in and immediately beneath these cappings have been prospected, but in Riverside County, little if any material has yet been marketed from this source.

The basin in and around which the marl and travertine deposits formed was probably broad and shallow. Whether it was a lake or an extension of the Gulf of California has yet to be determined but in either case the basin was filled by Quaternary clay, silt, sand and gravel deposits of the Colorado River flood plain - the Chemehuevis Gravel (plate ___).

Lee described the Chemehuevis Gravel (1908, p. 18), as a valley filling as much as 700 feet thick deposited during an aggrading stage of the Colorado River. In eastern Riverside County this deposit now underlies bluffs, badlands, and the Palo Verde Mesa. The deposit is characterized by local changes in the size and composition of sedimentary material. The river bluffs along the east side of the Maria and Riverside Mountains contain much locally derived rock debris. Badlands near Vidal and south of the Palen Mountains are cut in bedded silt and clay resembling lake, bay or estuarine deposits. The Palo Verde Mesa, north and west of Blythe, consists of clay, silt, sand, gravel and fragments of apparently reworked clay.

Near areas of exposed bedrock, where coarse debris is proportionately dominant, the Chemehuevis Gravel has been used for road material and as a source of aggregate. Just north of the county line, near Vidal, clay beds are quarried on a small scale for use in drilling mud. South of the Palen Mountains similar deposits have been prospected but not yet (1961) developed (Tucker and Sampson, 1945, pl. 35).

R. Sault
10/16/66

LIST OF MINES AND MINERAL DEPOSITS IN
RIVERSIDE COUNTY

(work sheet for map)

All locations within San Bernardino Base line and Meridian

No.	Name	Sec.	T.	R.	Quadrangle
<u>Antimony</u>					
1.	Mountain Group	8	4S	7W	Black Star Canyon
<u>Arsenic</u>					
2.	Shining Star	6	6N	4W	Lake Elsinore
<u>Asbestos</u>					
3.	Charleboix (Percival Asbestos)	29,32	6S	5E	Palm Desert
<u>Beryllium</u>					
4.	Santa Rosa Mountain	19	7S	5E	Idyllwild
<u>Clay</u>					
5.	Atlas Pit	26	4S	6W	Lake Mathews
6.	Bedford Canyon (Corona) Clay Deposit	16	4S	6W	Corona South
7.	Brown	23,24	1S	23E	Vidal
8.	Cajalco	16	4S	6W	Corona South
9.	Chocolate Drop	17	4S	6W	Corona South
10.	Condit Clay	32,33	3S	7W	Corona South
11.	Corona Clay Pit	26	4S	6W	Lake Mathews
12.	Corona Placer (Lord?)	14	4S	7W	Corona South
13.	Douglas Pit	22	5S	5W	Alberhill
14.	Eagle Canyon (Fraser)	13	4S	7W	Corona South
15.	Elsinore Clay Company (Morton) Clay deposit	31	5S	4W	Elsinore
16.	Elsinore Joint Property	26	5S	5W	Elsinore
17.	El Sobrante	26	4S	6W	Lake Mathews

No.	Name	Sec.	T.	R.	Quadrangle
18.	Enasco	33	3S	7W	Corona South
19.	Evans Shafts	31	5S	4W	Elsinore
20.	Findley Feldspar	33	3S	7W	Corona South
21.	Findley Graphite	4	4S	7W	Corona South
22.	Findley Prospect	2	5S	6W	Lake Mathews
23.	Fire Clay	4,5	4S	7W	Corona South
24.	Grapevine	4	4S	7W	Corona South
25.	Harlow Pit	15	4S	6W	Lake Mathews
26.	Harrington (Enasco) Pit	25	4S	6W	Lake Mathews
27.	Hoist Pit	26	5S	5W	Elsinore
28.	International Pipe & Ceramics Corp., Corona Plant	16	4S	6W	Corona South
29.	International Pipe & Ceramics Corp. (Gladding, McLean & Co.) Alberhill Dist.	21,22	5S	5W	Alberhill
30.	Jones (Hoffman, Hoag Ranch)	19	4S	6W	Corona South
31.	Jordan Tile Manufacturing Company	26	3S	7W	Corona North
32.	Kroonen (Keno, Dutch Placer)	4,9,10	4S	7W	Corona South
33.	Liston Brick Company	16	4S	6W	Corona South
34.	Los Angeles Brick & Clay Products Co.	21,22,28	5S	5W	Alberhill
35.	McClintock	4	4S	7W	Corona South
36.	McKnight	3,9,10	4S	7W	Corona South
37.	Middlesworth (Brown Star, Lord? Freeman?)	11,14,15	4S	4W	Corona South
38.	Hunt (Mission) Clay Products	34	4S	6W	Lake Mathews
39.	Murphy Pit	35	4S	6W	Lake Mathews
40.	Oak Park Clay Prospect	18	5S	5W	Alberhill
41.	Pacific Clay Products Alberhill Mines	15,22,23,26	5S	5W	Alberhill
42.	Pacific Clay Products, Corona Plant	26	3S	7W	Corona North
43.	Pacific Clay Products, DeGuerra Mines	27	5S	5W	Alberhill
44.	Palen Mountains	24,25	5S	17E	Sidewinder Well
45.	Park	26	4S	6W	Lake Mathews
46.	Peterson's	29	4S	6W	Corona South
47.	Prospect (name undetermined)	14	5S	5W	Elsinore
48.	Prospect (name undetermined)	16	5S	5W	Alberhill
49.	Quintet	26	4S	6W	Lake Mathews
50.	Red Top	20,21	6S	9E	Thermal Canyon

No.	Name	Sec.	T.	R.	Quadrangle
51.	Sievert Clay Prospect	36	6S	5W	Wildomar
52.	Silt deposit (name undetermined)	5	5S	3W	Perrie
53.	Sky Ranch Clay Company Deposits=	4, 5	4S	7W	Corona South
54.	Sky Ranch	4	4S	7W	Corona South
55.	South Pit	35	4S	6W	Lake Mathews
56.	Susie Placer (McVicar Pit)	4	4S	7W	Corona South
57.	Switzer	5	4S	7W	Corona South
58.	Temescal	35	4S	6W	Lake Mathews
59.	Temescal Water Co.	35	4S	6W	Lake Mathews
60.	Terra Cotta Eighty	26	5S	5W	Alberhill
61.	Terra Cotta Plant Site	26=	5S	5W	Alberhill
62.	Thomas Clay Deposit, East Pit	33	3S	7W	Corona South
63.	Thomas Clay Deposit, West Pit	33	3S	7W	Corona South
64.	Tropico (Temescal) Tract	26	4S	6W	Lake Mathews
65.	Twin Springs (Temescal Sixty) Prospect	12	5S	6W	Lake Mathews
66.	Undetermined	16	4S	6W	Corona South
67.	Undetermined	33	3S	7W	Corona South
68.	Undetermined	4	4S	7W	Corona South
69.	Undetermined	3	4S	7W	Corona South
70.	Wardlow (Sky Ranch)	4, 5	4S	7W	Corona South
71.	Wildomar Kaolin Deposit	7	7S	3W	Murrieta
<u>Coal</u>					
72.	Alberhill Coal and Clay Company Coal Deposit (Colliers & Cheney Coal Mine)	22	5S	5W	Alberhill
73.	Dolbear and Hoff Mine	26	5S	5W	Alberhill
<u>Copper</u>					
74.	Anderson (Hope)	11, 14	2S	12E	Dale Lake
75.	Astec	30	4S	20E	Midland
76.	Big Basin (Hines) Copper Prospect	3	4S	6W	Lake Mathews
77.	Big Horn	32, 33	3S	20E	Midland
78.	Cactus Hill	17	2S	5E	Thousand Palms
79.	Collins Prospect	4	4S	6W	Corona South
80.	Copper Point	10	2S	12E	Dale Lake

No.	Name	Sec.	T.	R.	Quadrangle
81.	Eagle Nest	30	4S	20E	Midland
82.	Green Hornet	32	7S	21E	McCoy Spring
83.	Homestake	7, 18	4S	19E	Palen Mountains
84.	Indian Copper	18	2S	5E	Thousand Palms
85.	Little Mountain (Lion's Den)	7	4S	22E	Big Maria Mountains
86.	Nancy	3 ?	4S	13E	Eagle Tank
87.	Orphan Boy	10	3S	18E	Palen Mountains
88.	St. John	32	4S	20E	Midland

Feldspar and Silica

89.	Brown	35	4S	11E	Pinkham Well
90.	Bundy-Murrieta	17	6S	3W	Romoland
91.	California Land and Mineral Co.	4, 5	7S	3W	Murrieta
92.	Coahuila Brave (Williamson)	17	7S	2E	Hemet
93.	Hemet Silica	26	5S	1W	Hemet
94.	Lang Silica	7	8S	2E	Aguanga
95.	Nettleton	14	6S	4W	Lake Elsinore
96.	Perris Mining Co.	16	6S	3W	Romoland
97.	Southern Pacific	31	4S	2W	Lakeview
98.	Spicer Silica	29	2S	4W	Riverside East
99.	Stone and Alexander	19	2S	5W	Riverside West
100.	Tully	32	4S	2W	Lakeview
101.	White Prince (Yellow Queen)	25	4S	5W	Steel Peak

Fluorite

102.	Fluorspar Group	10	3S	18E	Palen Mountains
103.	Orocopia Fluorspar	25	6S	12E	Canyon Spring
104.	Red Bluff	24	3S	20E	Midland

Gems

105.	Anita (Hagge)	22	6S	1E	Hemet
106.	Belo Horizonte (Columbia Gem, California Gem, April Fool)	1	7S	3E	Idyllwild

No.	Name	Sec.	T.	R.	Quadrangle
107.	Fano (Simmons)	33	6S	2E	Hemet
108.	Juan Diego #1	5	7S	2E	Hemet
109.	Juan Diego #2	32	6S	2E	Hemet
110.	Mile Mountains, Fire Agate	26,27 — 34,35	8S	20E	Palo Verde Mountains
111.	Olinger Deposit	1	7S	2E	Idylwild
112.	Schindler	29,30,32,33	6S	2E	Hemet
113.	Storn-Jade Mountain	4	4S	13E	Eagle Tank
<u>Gold</u>					
114.	Alice	25	1S	23E	Vidal
115.	Alica	24	6S	3W	Romoland
116.	Anaheim-	6	2S	10E	Valley Mountain
117.	Anna Bell	24	4S	22E	Big Maria Mountains
118.	Arlington Tunnel	13	4S	5W	Steele Peak
119.	Atlanta (Ronnla B)	1	2S	9E	Valley Mountain
120.	Augustine	8,17	8S	17E	Chuckwalla Spring
121.	Aztec and Rainbow	19	7S	17E	Sidewinder Well
122.	Barrel Tanks Placer	157	2S	13E	Eagle Tank
123.	Beal	19	7S-	16E	Chuckwalla Mountains
124.	Bill Rush	19	2S	10E	Pinkham Well
125.	Black Butte (Gold Tiger)	10	2S	8E	Twentynine Palms
126.	Black Warrior (Gold Master ? Paymaster ?)	20	2S	10E	Pinkham Well
127.	Boss (Goat or Goat Basin)	1	2S	9E	Valley Mountain
128.	Brooklyn (36 1S 12E)	1	2S	12E	Dale Lake
129.	Brown (Hillside, Priest)	7	2S	20E	Rice
130.-	Brown Mine North	1	2S	19E	Rice
131.	Bryan	32	6S-	16E	Chuckwalla Mountains
132.	Cactus	22,27	3S	13E	Eagle Tank
133.	Captain Jinks (Jenks)	1	4S	10E	Pinkham Well
134.	Carlos Jr.	1	2S	9E	Valley Mountain
135.	Cathy Jean	25	1S	23E	Vidal
136.	Chuckwalla Spring	9,10,16	8S	17E	Chuckwalla Spring
137.	C.O.D.	2	7S	15E	Chuckwalla
138.	Combination Quartz	127	4S	10E	Pinkham Well
139.	Copper Giant (?)	28	4S	9E	Lost Horse Mountain

No.	Name	Sec.	T.	R.	Quadrangle
140.	Corona (Peggy)	32	4S	4W	Steele Peak
141.	Cow Bell	2,10	2S	11E	Valley Mountain
142.	Crescent (Baumok)	1	7S	14E	Chuckwalla Mountains
143.	Dalton	24?	2S	11E	Pinkham Well
144.	Desert King	14	2S	12E	Eagle Tank
145.	Desert Queen (McLaney)	5,6	2S	9E	Twentynine Palms
146.	Dr. Dnick	19	4S	4W	Steele Peak
147.	Dos Palmas	16	7S	12E	Canyon Spring
148.	Dottie Walborn	31?	6S	15E	Chuckwalla Mountains
149.	Double Jack	19	6S	21E	McCoy Spring
150.	Duplex	14?	2S	12E	Eagle Tank
151.	Elton (Lucky Boy)	8	2S	9E	Twentynine Palms
152.	Eureka	6?	7S	15E	Chuckwalla Mountains
153.	Frank Hill (Star)	13?	2S	11E	Pinkham Well
154.	Gavilan	19	4S	4W	Steele Peak
155.	Gold Crown (Bon Ton)	10,15	2S	12E	Dale Lake
156.	Gold Crown (San Diego)	4 or 5	6S	15E	Chuckwalla Mountains
157.	Gold Cup	23?	6S	13E	Canyon Spring
158.	Gold Dollar	36	1S	23E	Vidal
159.	Gold Fields of America	5	3S	10E	Pinkham Well
160.	Gold Galena (Gold Coin)	8,9	3S	9E	Lost Horse Mountain
161.	Gold Park Consolidated (?) No. 1	2	2S	9E	Twentynine Palms
162.	Gold Park Consolidated (?) No. 2	1	2S	9E	Valley Mountain
163.	Gold Park Consolidated (?) No. 3	1	2S	9E	Valley Mountain
164.	Gold Park Consolidated (?) No. 4	6	2S	10E	Valley Mountain
165.	Gold Park Consolidated (?) No. 5	12	2S	9E	Valley Mountain
166.	Gold Point	5	3S	10E	Pinkham Well
167.	Gold Rice	12	2S	33E — 23E	Vidal
168.	Gold Shot	28	6S	4E	Idyllwild
169.	Gold Standard	1	2S	12E	Dale Lake
170.	Gold Standard	9,10	3S	8E	Lost Horse Mountain
171.	Golden Bee	16	3S	10E	Pinkham Well
172.	Golden Bell (Blue Bell)	8?	3S	10E	Pinkham Well

No.	Name	Sec.	T.	R.	Quadrangle
173.	Golden Bird	28	1S	22E	Vida
174.	Golden Charlotte (Golden Chariot)	31	4S	4W	Steele Peak
175.	Golden Eagle	147	5S	13E	Canyon Spring
176.	Golden Egg	14	2S	12E	Eagle Tank
177.	Golden Nuggett	34	5S	10E	Cottonwood Spring
178.	Golden Nugget	30	4S	4W	Steele Peak
179.	Golden Rod	1	2S	12E	Dale Lake
180.	Good Hope	15	5S	4W	Elsinore
181.	Granite	4	6S	15E	Chuckwalla Mountains
182.	Grandaddy	5	8S	21E	McCoy Spring
183.	Grubstake	5	6S	21E	McCoy Spring
184.	Hansen (Hansen) (Hansen Well)	26	3S	8E	Lost Horse Mountain
185.	Happy Jack	31	6S	16E	Chuckwalla Mountain
186.	Helicross	37	2S	12E	Dale Lake
187.	Hewet Belle	29	6S	4E	Idyllwild
188.	Hexahedron (Hexie)	11	3S	9E	Lost Horse Mountain
189.	Hidden (Enspiration, Lost Mine Parallel)	7	3S	8E)	
		127	3S	7E)	Lost Horse Mountain
190.	Hidden Treasure	13	8S	20E)	
	(American Flag)	18	8S	21E)	Palo Verde Mountains
191.	Hoag	24	4S	5W	Steele Peak
192.	Hodges	4	8S	21E	McCoy Spring
193.	Hornet	1	2S	9E	Valley Mountain
194.	Ida-Leona	30	4S	4W	Steele Peak
195.	Indian Rose Quartz Queen (Indian Queen)	32	4S	4W	Steele Peak
196.	Iron Chief	35?	3S	13E	Eagle Tank
197.	Jean (Postmaster)	35	1S	23E	Vidal
198.	John's Camp	4	2S-	9E	Twentynine Palms
199.	Jumbo	30, 31	4S	4W	Steele Peak
200.	Lane	10	6S	15E	Chuckwalla Mountains
201.	Langdon	10	4S	22E	Big Maria Mountains
202.	Last Chance	267	6S	15E	Chuckwalla Mountains
203.	Leon	18	6S	2W	Romoland
204.	Lost Angel (Laseter, Sippi?)	35	3S	8E	Lost Horse Mountains
205.	Lost Horse	3	3S	8E	Lost Horse Mountain

No.	Name	Sec.	T.	R.	Quadrangle
206.	Lost Pony	24	6S	14E	Chuckwalla Mountains
207.	Louise	17	2S	12E	Pinkham Well
208.	Lucky Boy (Walker)	9	6S	3W	Romoland
209.	Lucky Dollar	247=	5S	13E	Canyon Spring
210.	Lucky Strike (Ophir)	21	5S	4W	Lake Elsinore
211.	Lim Gray (Arica, Gray, Long Shot, Priest)	12	2S	19E	Rice
212.	Maggie (Little Maggie)	32	4S	4W	Steele Peak
213.	Mammoth	8	6S	3W	Romoland
214.	Mastodon	13,14	5S	11E	Cottonwood Spring
215.	Meek (Thelma and Desert Gold)	14	2S	12E	Eagle Tank
216.	Menifee	5	6S	3W	Romoland
217.	Mine (Name undetermined)	87=	3S	10E	Pinkham Well
218.	Mine (Name undetermined)	34	2S	8E	Lost Horse Mountain
219.	Mine (Name undetermined)	4	3S	8E	Lost Horse Mountain
220.	Mine (Name undetermined)	10	3S	8E	Lost Horse Mountain
221.	Mine (Name undetermined)	33	2S	8E	Lost Horse Mountain
222.	Mission (Huff-Lane)	14,21	2S	12E	Eagle Tank
223.	Mission Sweet	347	3S	13E	Eagle Tank
224.	Model	2	7S	14E	Chuckwalla Mountains
225.	Moose	11,12	2S	12E	Dale Lake
226.	Morning Star	32	6S	16E	Chuckwalla Mountains
227.	Morning Star (Jackknife, Morgan)(6 2S 24E)	31	1S	24E	Vidal
228.	Morris Washington	22	4S	4W	Steele Peak
229.	Moser (Gold Flake?, Patches?)	20,21	2S	16E	Coxcomb Mountains
230.	Mountain Queen	7	2S	20E	Rice
231.	Mountaineer (Calzona)	31	1S	24E	Parker
232.	Mystery (Mistry)	157	2S	13E	Eagle Tank
233.	New El Dorado (El Dorado)	16,17	3S	10E	Pinkham Well
234.	New El Dorado (Pinyon Well) Millsite	24	3S	8E	Lost Horse Mountain
235.	North Star	6	2S	10E	Valley Mountain
236.	North Star (Sunset)	14	2S	12E	Eagle Tank
237.	Nuisance	12	2S	9E	Valley Mountain
238.	Oehl Placer	1	2S	12E	Dale Lake
239.	Outlaw	17	2S	13E	Dale Lake
240.	Pinto	14	2S	12E	Eagle Tank

No.	Name	Sec.	T.	R.	Quadrangle
241.	Pinto (Calidonia)	1	2S	9E	Valley Mountain
242.	Pinto Chief	1	2S	12E	Dale Lake
243.	Pinyon (Tingman-Holland)	26	3S	8E	Lost Horse Mountain
244.	Poulson	29	6S	4E	Idyllwild
245.	Prospect (name undetermined)	16	2S	12E	Eagle Tank
246.	Prospector	18	2S	24E	Poston
247.	Rainbow	7	8S	21E	McCoy Spring
248.	Red Cloud	57	7S	15E	Chuckwalla Mountains
249.	Red Streak	227	6S	15E	Chuckwalla Mountains
250.	Red Top	347	6S	15E	Chuckwalla Mountains
251.	Renrut-Reerg (Alveston)	29	6S	4E	Idyllwild
252.	Rice	31	7S	1E	Sage
253.	Rich Gold (Gold Crown #2)	87	3S	10E	Pinkham Well
254.	Romoland	23,26	5S	3W	Romoland
255.	Roosevelt (Roosevelt and Rainbow, Santa Fe)	7	8S	21E	McCoy Spring
256.	Rose of Peru	1	2S	12E	Dale Lake
257.	Ruby Lee	10	4S	11E	Pinkham Well
258.	Rusty Gold (Summit or Sunset)	15	2S	12E	Eagle Tank
259.	San Antonio	32	4S	4W	Steele Peak
260.	Santa Fe	31	4S	4W	Steele Peak
261.	Santa Rosa (Rosario, Northern Belle)	30,31	4S	4W	Steele Peak
262.	Schellenger	18	4S	22E	Big Maria Mountains
263.	Shannon	1	2S	9E	Valley Mountain
264.	Silver Bell	87	3S	10E	Pinkham Well
265.	Silver Scorpion	1	2S	9E	Valley Mountain
266.	Sinock	177	2S	12E	Eagle Tank
267.	Smith Brothers No. 1 and No. 4	7,8	2S	10E	Valley Mountains
268.	Smith Brothers No. 8	19	2S	10E	Valley Mountains
269.	Snowcloud	6	5S	10E	Pinkham Well
270.	Standard	13	2S	12E	Eagle Tank
271.	Stanford	9	5S	4W	Steele Peak
272.	Stanford (Small Prospects near)	5	5S	4W	Steele Peak
273.	Steeco (Black Canyon)(6 2S 24E)	1	2S	23E	Parker
274.	Stella	10	2S	12E	Dale Lake

No.	Name	Sec.	T.	R.	Quadrangle
275.	Sterling	307	6S	14E	Canyon Spring
276.	Stone House	4	8S	21E	McCoy Spring
277.	Sunrise	26	2S	12E	Eagle Tank
278.	Top of the World (Victor, La Plomo, Staele)	32	4S	4W	Steele Peak
279.	Triangle (Pilot)	1	7S	15E	Chuckwalla Mountains
280.	Twin Buttes No. 1	18	5S	2W	Winchester
281.	Twin Buttes No. 2	18	5S	2W	Winchester
282.	Undetermined	4	5S	5W	Lake Mathews
283.	Undetermined	4	5S	5W	Lake Mathews
284.	Vidal Line	19	1S	24E	Vidal
285.	Virginia (Missing Link, Virginia Shay)	32,33	4S	4W	Steele Peak
286.	Washington	24	4S	5W	Steele Peak
287.	Zulu Queen	15	2S	13E	Dale Lake
<u>Gypsum</u>					
288.	Big Chief (Freeman-Nonhof, White Gypsum, Ware)	9,10	4S	7W	Corona South
289.	Eagle Canyon (Frazer)	13,24	4S	7W	Corona South
290.	Elki	10	4S	7W	Corona South
291.	Ragador Canyon	10,15,16	4S	7W	Corona South
292.	Jameson	3	4S	7W	Corona South
293.	Main Street (Gypsum) Canyon	14,15	4S	7W	Corona South
294.	Maria Mountains	1,2,3,4, 30,31,34, 35	4S	20E	Midland and Big Maria Mountains
			3S	21E	" " " "
		5,6,7	4S	21E	" " " "
295.	Morning Star	1	2S	23E	Vidal
		31	1S	24E	"
		6	2S	24E	"
296.	Palen Mountains	1,2,3, 10,11,12, 13,14,15	3S	18E	Palen Mountains
297.	Riverside Mountains	6,7	2S	24E	Parker and Vidal
298.	Tecumseh	9,10	4S	7W	Corona South
		15,16			" "
299.	White Gypsum	9,10	4S	7W	" "
		16			

No.	Name	Sec.	T.	R.	Quadrangle
<u>Iron</u>					
300.	Black Giant	34,35	3S	13E	Eagle Tank
301.	Eagle Mountain	34,35			
		36	3S	14E	Coxcomb Mountains
302.	East Wide Canyon (Iron-Titanium)	17	2S	6E	Thousand Palms
303.	Iron Cap (Maria Mountains Iron)	14,15	4S	22	Big Maria Mountains
304.	Iron Cap and Iron King	19	5S	18E	Sidwinder Well
305.	Iron King and Iron Queen	21,28	5S	18E	Sidwinder Well
306.	Lindy Coop No. 1	36	4S	22E	Big Maria Mountains
307.	Prospect (name undetermined)	1	2S	23E	Vidal
308.	Sulphide Bismuth (Lang)	11	2S	7E	Twentynine Palms
<u>Lead -- Silver -- Zinc</u>					
309.	Bald Eagle (Mgcl)	27,34	3S	21E	Midland
310.	Black Eagle	30?	3S	14E	Eagle Tank
311.	Cap Hunter (Poor Boy)	33	7S	16E	Chuckwalla Mountains
312.	Corona Lead-Zinc	14	4S	7W	Corona South
313.	Desert Center	18,19	7S	17E	Chuckwalla Mountains
314.	Groover (Carbonate Lead)	4	2S	11E	Valley Mountain
315.	Jacklin	24	1S	22E	Vidal
316.	Ragsdale	19	7S	17E	Sidwinder Well
<u>Limestone</u>					
317.	Best Ranch	28	5S	4W	Lake Elsinore
318.	Big Maria Mountains Limestone deposits	20,21,22, 27,28,34,35	4S	22E	Big Maria Mountains
319.	Blind Canyon	18	2S	5E	Palm Springs
320.	Blue Diamond and Eagle	17,18	4S	1E	San Jacinto
321.	Castro Quarry (Magstone Products)	1	3S	5W	Riverside East
322.	Chino Canyon Deposits	5,6	3S	4E	Palm Springs
323.	Eden Hot Springs Limestone Deposit	25	3S	2W	El Casco
324.	Fingal Deposit	17	3S	3E	Palm Springs
325.	Glen Avon (Mathews)	2	2S	6W	San Bernardino

No.	Name	Sec.	T.	R.	Quadrangle
326.	Guiberson (Whitewater) Deposit	23,22	3S	3E	Palm Springs
327.	Hubbard Limestone deposit	24	4S	1W	San Jacinto
328.	Jensen Quarry	5	2S	5W	San Bernardino
329.	Lamb Canyon (Snyder) deposit	32	3S	1W	Lakeview
330.	Maria Mountains Marl	27	5S	23E	Blythe Northeast
331.	Moore Limestone deposit (Bautista Canyon Deposits)	34	5S	1E	Hemet
332.	Mount Edna deposit	28	3S	1E	San Jacinto
333.	New City Quarry	36	2S	5W	Riverside East
334.	Nightingale (Harris)	6,8,9 10,11,12	7S	5E	Idyllwild
335.	Nonhof	16?	4S	7W	Corona South
336.	Novella Limestone deposit	26,27	3S	3E	Palm Springs
337.	Potrero Creek deposit	34	3S	1W	San Jacinto
338.	Prospect (name undetermined)	32	4S	6W	Corona South
339.	Riverside Cement Co. (Crestmore)	2,3	2S	5W	San Bernardino
340.	San Jacinto Rock Products Co.'s Limestone deposit (Bautista Canyon Deposits)	35	5S	1E	Hemet
341.	Sims Limestone deposit	12	4S	1W)	
		7	4S	1E)	San Jacinto
342.	Snow Rock	5	2S	5W	San Bernardino
343.	Southern Pacific deposit	23,25	3S	3E	Palm Springs
344.	Whitestone	8,9,17	2S	5E	Joshua Tree and Thousand Palms
345.	Whitlock limestone deposit	27,23,34	6S	4E	Idyllwild
<u>Magnesite</u>					
346.	Hemet Magnesite	31	5S	1W	Winchester
<u>Manganese</u>					
347.	Arlington Black Jack	18,19	4S	20E	Midland
348.	Arlington No. 3	19	4S	20E	Midland
349.	Beal-McClellan (Black Eagle and Newport, Brum and Newport)	23	5S	4W	Lake Elsinore
350.	Big Bullett	31	6S	11E	Mortmar

No.	Name	Sec.	T.	R.	Quadrangle
351.	Black Ace (Doran)	23	3S	18E	Palen Mountains
352.	Black Rock	22	3S	23E	Big Maria Mountains
353.	Black Strike (Grosse)	19	4S	20E	Midland
354.	George (Red Rock)	32, 33	4S	20E	Midland
355.	Langdon	17	4S	21E	Midland
356.	Lucky Boy (Paddy Faulkner)	24	3S	20E	Midland
357.	Manganese Canyon	13, 24	4S	19E	Midland
358.	Yellow Stone (Giant Chief)	24	3S	20E	Midland
<u>Mica</u>					
359.	Ida V.	10	7S	2E	Hemet
360.	Johnson	9	3S	6E	Thousand Palms
361.	Pine Knot (Lucky Day, Lucky Fay)	6	2S	7E	Joshua Tree
<u>Mineral Paint</u>					
362.	Lord	14, 15	4S	7W	Corona South
363.	National Paint and Color Co.	14	4S	7W	Corona South
364.	Paint	14, 15	4S	7W	Corona South
<u>Mineral Springs</u>					
365.	City of Elsinore	6	6S	4W	Elsinore
366.	Crestwell Baths	Cor. 5, 6, 7, 8	6S	4W	Elsinore
367.	Desert Hot Springs	30	2S	5E	Thousand Palms
368.	Eden Hot Springs	23	3S	2W	El Casco
369.	Gilman Hot Springs	9	4S	1W	San Jacinto
370.	Glen Ivy Hot Springs	10	5S	6W	Lake Mathews
371.	Highland Springs	25	2S	1W	Beaumont
372.	Lake Elsinore Hotel	Cor. 5, 6, 7, 8	6S	4W	Elsinore
373.	Lakeview Inn Hot Springs	7	6S	4W	Elsinore
374.	Marrieta Hot Springs	13, 14	7S	3W	Marrieta
375.	Nicholls Warm Springs	36	6S	21E	Ripley
376.	Palm Springs	14	4S	4E	Palm Springs
377.	Soboba Hot Springs	30	4S	1E	San Jacinto

No.	Name	Sec.	T.	R.	Quadrangle
<u>Molybdenum</u>					
378.	4 L'S	34	43	2E	Lake Fulmor
<u>Pent</u>					
379.	Burro Flats	14	2S-	1E	Cabazon
<u>Perlita</u>					
380.	Great Western Exploration Co.	26,27	8S	18E	Chuckwalla Spring
<u>Rare-Earths</u>					
381.	Ajax	6	2S	10E	Valley Mountain
382.	Baby Blue	9	23	10E	Valley Mountain
383.	Desert View	31,32	5S	10E	Cottonwood Spring
384.	Live Oak Tank	16,17	2S	9E	Lost Horse Mountain
385.	Peerless Nuclear	5,8,16?	23	10E	Valley Mountain
386.	U-Thor	21	2S	10E	Pinkham Well
<u>Rock Products</u>					
(Dimension Stone)					
387.	Blue-Gray Granite Quarry	14	4S	4W	Steele Peak
388.	Mt. Hole Quarries	8,16,17	3S	6W	Corona North
389.	Rubidoux Hill Quarry	22	23	5W	Riverside West
390.	Sierra Grande Quarries	29	3S	6W	Corona North
391.	Temecula Quarries	30	8S	2W)	Temecula
		24	8S	3W)	

No.	Name	Sec.	T.	R.	Quadrangle
(Broken and Crushed Stone) (Granite)* (Roofing Granules)**					
392.	Bernasconi Quarry	11	4S	3W	Perris
393.	Blarnay Stone (Harlow, Corona) Quarry	15	4S	6W	Lake Mathews
394.	Box Springs Quarry	33	2S	4W	Riverside East
395.	Casa Blanca Quarries*	10	3S	5W	Riverside West
396.	Dendrite	14?	2S	12E	Eagle Tank
397.	Haven Granite Co.	9	2S	5W	San Bernardino
398.	Hole Ranch Quarry	22	3S	6W	Corona North
399.	Jameson	29	3S	6W	Corona South
400.	Juaro Canyon Quarry	20	4S	1E	San Jacinto
401.	Old City Quarry	14	2S	5W	Riverside West
402.	Ormand Quarry	9	2S	5W	San Bernardino
403.	Painted Hill	35, 36	2S	3E	Whitewater
404.	Palo Verde Dam Quarries	14, 18, 19	5S	23E	Blythe N.E.
405.	Sidebotham (Phillips) Quarry	5	4S	6W	Corona South
406.	Storn Sulfide (Green Giant-Long Green)	4, 5?	4S?	13E	Eagle Tank
407.	Stringfellow (Bly Bros., and McGilliard, Shannon)	1	2S	6W	San Bernardino
408.	Temescal Canyon (Hawley, Pacific Rock and Gravel Co) Rock Quarry	4 33	4S 3S	6W) 6W)	Corona South
409.	Temescal Rock Quarry**	4	4S	6W	Corona South
410.	Undetermined *	2	3S	6W	Riverside West
411.	Undetermined	3	2S	6W	San Bernardino
412.	(Decomposed Granite)				
412.	Arnold Heights Pit	27	3S	4W	Riverside East
413.	Brokar Pit	20	2S	5W	Riverside West
414.	Coplin Pit	29	3S	6W	Corona North
415.	Fontana Paving, Inc.	5	4S	6W	Corona South
416.	Nason Street Pit	3	3S	3W	Sunnymead
417.	Nuevo Road	24	4S	4W	Perris
418.	Riley Material Co.	25	2S	6W	Riverside West
419.	Riverside County Pit	2	4S	4W	Steele Peak

No.	Name	Sec.	T.	R.	Quadrangle
420.	Riverside County Pit	4	3S	6W	Corona North
421.	Riverside County Pit	19	6S	2W	Winchester
422.	Riverside County Pit	26	5S	3W	Romoland
423.	Riverside County Pit	29	5S	3W	Romoland
424.	Riverside County Pit	18	5S	3E	Idyllwild
425.	Riverside County Pit	19	5S	1E	Hemet
426.	Riverside County Pit	9	4S	3W	Perris
427.	Riverside County Pit	25	2S	6W	Riverside West
428.	Riverside County Pit	12	3S	6W	Riverside West
429.	Riverside County Pit	11	6S	4W	Elsinore
430.	Riverside County Pit	23	6S	4W	Elsinore
431.	Riverside County Pit	8	6S	4W	Elsinore
432.	Sugar Loaf Pit	17	2S	4W	Riverside East
433.	(Undetermined)	30	4S	4W	Steele Peak
434.	(Undetermined)	2	2S	6W	San Bernardino
435.	(Undetermined)	17	3S	4W	Riverside East
436.	(Undetermined)	32	2S	4W	Riverside East
437.	(Undetermined)	15	3S	4W	Riverside East
438.	(Undetermined)	10	3S	4W	Riverside East
439.	(Undetermined)	36	3S	6W	Lake Mathews
440.	(Undetermined)	32	2S	5W	Riverside West
441.	(Undetermined)	14	5S	2W	Winchester
442.	(Undetermined)	36	4S	4W	Steele Peak
443.	(Undetermined)	14	2S	6W	Riverside West
444.	(Undetermined)	22	2S	6W	Riverside West
445.	(Undetermined)	29	3S	5W	Riverside West
446.	(Undetermined)	29	3S	5W	Riverside West
447.	(Undetermined)	25	3S	6W	Riverside West
448.	(Undetermined)	25	3S	6W	Riverside West
449.	(Undetermined)	11	4S	4W	Steele Peak
450.	(Undetermined)	5	3S	5W	Riverside West
451.	(Undetermined)	32	4S	4W	Steele Peak

No.	Name	Sec.	T.	R.	Quadrangle
(Sand and Gravel)					
452.	Bardoo Adit	10	4S	8E	Lost Horse Mountain
453.	Corona Rock Co.	32	3S	6W	Corona South
454.	Desert Hot Springs, Ready Mix, Inc.	13	2S	4E	Desert Hot Springs
455.	Fan Hill Canyon	20	3S	7E	Thousand Palms
456.	Fargo Canyon	10	5S	8E	Indio
457.	Flat Top Mountain	33	3S	5E	Thousand Palms
458.	Hicks-Allred Indio Hills	5	4S	6E	Thousand Palms
459.	Industrial Asphalt, Corona Plant	29, 30	3S	6W	Corona North
460.	Massey Indian Ave.	23	3S	4E	Palm Springs
461.	Massey Indio Hills	3	5S	7E	Los Horse Mountain
462.	Massey Whitewater	11	3S	3E	Whitewater quad
463.	Mission Creek	16	2S	4E	Palm Springs
464.	Mirrieta Borrow Pit	-	-	-	Mirrieta
465.	Pomona Ready Mix Concrete	5	4S	6W	Corona South
466.	Riverside County Gravel Pit	29	6S	7E	Palm Desert
467.	Riverside County Gravel Pit	20	7S	3E	Idyllwild
468.	Riverside Sand Company	25	2S	6W	Riverside West
469.	San Geronimo Rock Products	3	3S	1E	Banning
470.	Service Rock (The Service Gravel) Co.	3, 10	2S	5W	Riverside West
471.	Shepells Big Maria	27	5S	23E	Blythe North East
472.	Thermal Canyon Wash	18	6S	9E	Thermal Canyon
473.	Triangle Rock Products, Inc. Mira Loma Plant	6	2S	6W	Gausti
474.	(Undetermined)	8	3S	2W	El Casco Quad.
475.	(Undetermined)	8	3S	2W	El Casco
476.	(Undetermined)	14	4S	1W	San Jacinto
477.	(Undetermined)	32	4S	3E	Lost Horse Mountain
478.	(Undetermined)	6	4S	6E	Thousand Palms
479.	(Undetermined)	23	4S	6W	Corona South
480.	Valley Rock and Sand Corp.	22	3S	2W	El Casco
481.	Valley Transit Cement Co.	31	8S	9E	Oasis
482.	Yeager Indio Hills	5	4S	6E	Thousand Palms

<u>No.</u>	<u>Name</u> (Specialty Sands)	<u>Sec.</u>	<u>T.</u>	<u>R.</u>	<u>Quadrangle</u>
433.	Corona Silica Sand Deposit	21, 16	4S	6W	Corona South
434.	Coronita Ranch	16, 17	4S	6W	Corona South
435.	Jackson and Havens	117	4S	7W	Corona South
436.	Jurupa (Riverside) Moulding Sand	29	2S	5W	Riverside West
437.	Ronhof	10	4S	7W	Corona South
438.	Smith Silica Pit	17	4S	6W	Corona South
439.	Temescal Canyon	29	4S	6W	Corona South

Talc

490.	Palen Mountains	18	5S	18E	Sidwinder Well
491.	Tunnel	23	7S	11E	Orocopia Canyon

Tin

492.	Black Rock (North Black Rocks)	19, 19	4S	5W	Lake Mathews
493.	Chief of the Hills	3, 4	6S	4W	Elsinore
494.	Holmes Ranch	12	4S	6W	Lake Mathews
495.	Moore	23, 24, 13, 14	4S	6W	Lake Mathews
496.	Prospect (name undetermined)	5	6S	4W	Elsinore
497.	Prospect (name undetermined)	22, 27	5S	4W	Elsinore
498.	South Black Rock	19	4S	5W	Lake Mathews
499.	Temescal (Cajalio)	2, 3, 10, 11	4S	6W	Lake Mathews

Tungsten

500.	Aztec (Chuckwalla Tungsten)	227	6S	15E	Chuckwalla Mountains
501.	Crescent	28	4S	23E	Big Maria Mountains
502.	Garnet Queen	20	7S	5E	Palm Desert
503.	Good Fairy	10, 15	8S	17E	Chuckwalla Springs
504.	Lucky Strike	33	8S	3E	Beauty Mountain
505.	Pawnee (Carr, Oak Grove)	31, 6	8S, 9S	3E, 3E	Beauty Mountain
506.	Red Ocher	26	3S	20E	Midland
507.	Tubbs	57	7S	15E	Chuckwalla Mountains

Uranium

508.	Caproni-Woock	13, 14, 23, 24	6S	23E	McCoy Spring
509.	Ram	4	2S	11E	Valley Mountain

Antimony

Antimony

Mountain Group (Crowell, Mabey Canyon) Deposit

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 8, T. 4 S., R. 7 W., S.B.M., Black Star Canyon quadrangle, 7 $\frac{1}{2}$ ', 1950; about 4 $\frac{1}{2}$ miles southwest of Corona on the northeast side of the Santa Ana Mountains in the Cleveland National Forest, along the east side and about 100 feet above upper Mabey Canyon.

Ownership: Robert A. Matthey, Jr., 11359 Biona Drive, Los Angeles 66 (1953). Undetermined (1963).

History: In 1895 this property was known as the Crowell mine and was owned by J. Irving Crowell, South Riverside (Corona). By that date a number of superficial cuts had been made on the claim and several hundred pounds of stibnite had been mined from one cut. The property was idle and the principal workings were caved in 1895. Apparently the property remained idle until 1935 when Joseph Erenreich located the Mountain claim which he developed under the name Erenreich Gold Mines. In May, 1942, Mr. Erenreich first recognized antimony in the area and by December of that year four claims (Mountain 1-4) were under lease to R. A. Matthey, Sr. and a shipment of sorted antimony ore had been made to the Harshaw Chemical Company's smelter in El Segundo. Following this ship-

ment considerable effort was made to develop this deposit under the strategic minerals program and an access road was built, but apparently little, if any, ore was shipped during the remainder of World War II. By 1948 the property consisted of five claims held under a partnership of Robert A. Matthey and others, and was known as Mountain Antimony Mine. In October, 1948, two lots of ore were shipped to the Harshaw smelter. This smelter was shut down in 1949 and dismantled in 1950. Apparently no further shipments were made from the Mountain deposit, but small scale intermittent activity, including the stockpiling of several tens of tons of ore, continued until about 1953. The property has apparently since been idle.

Geology: A mineralized zone about 4 feet thick of altered volcanic rock occurs between two well-marked shear zones in fresh, green hornblende andesite of the Jurassic(?) Santiago Peak Volcanics. The shear zones strike north and dip 10° - 25° E. Altered rock is exposed along a strike length of about 40 feet and is reddish-brown on weathered surfaces, but is gray on fresh surfaces. This altered zone is cut by numerous thin veinlets of stibnite without apparent orientation. Disseminated bits of stibnite and small clots of pyrite also occur. Both calcite and quartz, as well as brown iron oxide, are associated with most of the stibnite veinlets. Nearly pure stibnite veinlets are as much as 2 inches thick and the quartz-calcite-stibnite veinlets average 2 to 3 inches thick.

In addition to stibnite a yellow oxide, apparently an alteration of stibnite, also occurs. Tests on one lot of ore that averaged 11.1 percent Sb, made by Harshaw Chemical Company, indicated that antimony was present as mixed sulfide and oxide and that 4.6 percent was Sb_2S_3 (Stibnite) and 6.5 percent was Sb_2O_3 (Cervantite?). Tucker and Sampson (1943, p. 66) reported that cut samples made at intervals along a 50-foot open cut assayed 10-28 percent antimony. Because of dense brush the extent of the deposit was not determined when the property was visited in April, 1958, but Tucker and Sampson (1945, p. 123) reported that stibnite occurs over an area about 200 feet by 500 feet in a series of nearly parallel veins ranging from 6 inches to 2 feet in width, and that on the hill-slope above large boulders of stibnite were found in the overburden.

Development: By 1942 workings included a caved lower adit at the creek level driven southeast 140 feet; about 100 feet above was an upper adit 20 feet long and an open cut on the vein for a distance of 50 feet. In 1958 the only working observed was a 10-foot adit driven N. 80°E. from the back of an open cut on a steep hillslope facing Mabey Canyon. The open cut is about 15 feet long, 15 feet wide, and 10 feet deep. A small mill and a "smelter" constructed of brick were located in lower Mabey Canyon at the Grapevine Clay Mine. The mill included a crusher, screens, and two flotation cells. Apparently the mill operated during 1948 but was not satisfactory and has since been dismantled.

Production: Total undetermined. That given below was shipped to the Harshaw smelter and probably includes most, if not all, of the production.

Year	lbs. ore (wet)	lbs. ore (dry)	Assay, Crude Sulfide ore			Total Sb Content recovered
			H ₂ O	Sb	As	
1942	792 (sorted ore)		1.0%	38.7%	0.34%	307 lbs.
1948	2,800	2,746	1.91%	34.2%	0.15%	939 lbs. \$
1948	1,907	1,890	0.90%	11.1%	0.13%	probably in process
Total	5,499					

References: Crawford, 1896, p. 31; Merrill, 1917 1919
Tucker and Sampson, 1923, p. 468
 p. 524; Tucker, 1921, p. 324; Tucker and Sampson, 1943,
 p. 65-66; Tucker and Sampson, 1945, p. 123.
 C.H.G. 4/26/58.

The deposit contains gold and arsenopyrite with traces of black manganese oxide. A sample representative of a 2-foot width of vein was reported to assay \$4.80 in gold, 12 percent arsenic, 7 percent sulfur, and 18 percent iron (Tucker, 1929, p. 469).

Development: In 1929 development consisted of 2 near-vertical shafts, 22 and 30 feet deep, and a 75-foot crosscut adit driven southward, its portal about 250 feet northwest of and 150 feet below the collar of the 30-foot shaft. The adit crossed 5 veins from 1 foot to 2 feet wide. In 1955 all workings were boarded but apparently uncaved.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 468-469; 1945, p. 123-124; Engel and others, 1959, p. 61. R.B.S., from Engle and others.

Shining Star Deposit

This report is based largely on information contained in a recently published description by Engel, Gay and Rogers (1959, p. 75-76).

Location: Sec. 6, T. 6 ^SN., R. 4 W., S.B.M.; U. S. Army Corps of Engineers, Lake Elsinore quadrangle, 15', 1942; on a town-lot building site on the north flank of a small, flat-topped hill just north of Pottery Street at Lewis Street, in the northwest part of Elsinore.

Ownership: Undetermined.

History: In 1929, James Wrench of Elsinore held three claims on the deposit (Engel and others, 1959, p. 61, pl.2).

Geology: The deposit is on a fault between quartzite and slate, and diorite and gabbro. Aplitic dikes are present in the gabbro and both rock types are decomposed near the surface, especially near the fault zone.

The fault zone, about 3 feet wide, trends N. 20° W. and dips about 68° SW. as exposed in the shaft collar. Sugary siliceous material occupies the fault ^{and} ~~zone~~ parallel siliceous veins are reported in the adjacent rocks.

Asbestos

ASBESTOS

Charleboix (Percival Asbestos) Claims

Location: Secs. 29 and 32, T. 6 S., R. 5 E., S.B.M., Toro Peak quadrangle, 1941; at the northwest edge of Pinyon Flat near Nightingale, a small resort on State Highway 74.

Ownership: Kenneth Charleboix, Corregador Street, Cathedral City, holds 9 claims. Under lease to Lee Wolfer, Box 80, Mountain Center (1958).

History: Early mining on these claims was by a combination of short adits and open pits (Merrill and Waring, 1917, p. 550-553; Tucker and Sampson, 1929, p. 499). Claims appear to have been located and worked in a small way as early as the turn of the century, but the only period of sustained activity appears to have been in 1930 (Tucker and Sampson, 1945, p. 159). In 1945 (Tucker and Sampson, p. 159) J. Wellman and Jack Harris, Pinyon Flat, were the owners.

Geology: An irregular shear zone cuts gneissic and schistose rocks in an arc roughly 3 miles long, along the west and southwest edge of Pinyon Flat. The width of the zone is difficult to determine because of low relief and overburden. It is as much as 200 feet wide in one exposure but this is probably made up of a series of parallel or en echelon shears. The shearing appears to have occurred along a thin ^{like} sill-like body of ultrabasic rock of uncertain attitude referred to by Tucker and Sampson (1945, p. 158-159) as cortlandite, a basic igneous rock composed largely of hornblende and olivine. Veins and cavities in this body are filled in part with tremolite asbestos. Biotite and chlorite are common as a soft schistose constituent in the shear zone. Much of the material has been sheared, granulated, and altered to a soft, gray, earthy gouge.

The tremolite occurs in veins ranging from a fraction of an inch to as much as 2 feet in thickness. The fresh material is solid and brittle, the fibers being difficult to separate. The weathered tremolite is soft and finely divided.

Development: Remnants of the old workings described by Merrill and Waring (1917, p. 552) still remain (June, 1958) but are unsafe or caved. The present operator plans to use open-pit methods. It is hoped that several products may be marketed, including (1) three grades of asbestos fiber, (2) biotite, thought to have possibilities as vermiculite, mica, and ⁽³⁾soil conditioner derived from the soft gouge material.

When visited (June, 1957) a mill was under construction but nothing more than assessment work had been done on the claims.

Production: During the early development of this property an unreported amount of tremolite asbestos was shipped to San Diego for use in mineral paint (Merrill and Waring, 1917, p. 552). In 1930, about 800 tons of asbestos were shipped to Soto Battery Box Manufacturing Co., Los Angeles (Tucker and Sampson, 1945, p. 158-159).

References: Merrill and Waring, 1917, p. 550-553; Tucker and Sampson, 1929, p. 499; 1945, p. 158-159. R.B.S. 6/26/58.

Percival Asbestos Mine

See Charleboix Claims.

Beryllium

Although beryl, the chief ore mineral of beryllium, has been mined in Riverside County for use as a gem (see herein under gems) it has not yet been found in sufficient quantity to warrant mining for its contained beryllium oxide. Indeed, western Riverside County contains some of the most beryl-rich pegmatite dikes in California, yet even these have been shown to contain only a fraction of 1 percent of the mineral (Wright, 1957, p. 75).

Perhaps the most recent (1959) discovery of beryl in Riverside County was in the vicinity of the Garnet Queen mine on the northwest flank of Santa Rosa Mountain, the most northerly peak of the Santa Rosa Mountains (see Santa Rosa Mountain Prospect).

Santa Rosa Mountain Prospect

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, T. 7 S., R. 5 E., S.B.M., Idyllwild quadrangle, 1959; on the northwest flank of Santa Rosa Mountain adjoining the Santa Rosa Mountain lookout road.

Ownership: In 1960, D. C. Walker, c/o Farmers Insurance Group, 1587 E. Colorado Street, Pasadena, held an undetermined number of unpatented claims on this deposit.

History: Undetermined.

Geology: The geology of the township in which this prospect is located was mapped by Lawrence B. Wright (1945, p. 9-13, pl. 1). Wright's map shows that the prospect is in one of numerous, extensive, west- to northwest-trending pendants of metasedimentary rocks separated by irregular bodies of granitic rock. In the vicinity of the prospect the country rock is cut by poorly exposed, beryl-bearing pegmatite dikes of undetermined number and extent. Exposed fragments of dike rock are as much as one foot thick. The dikes are composed of quartz, albite, muscovite, black tourmaline, and beryl. The beryl crystals are as much as one inch in diameter and four inches long. In surfacial material presently exposed the beryl is finely fractured and partially altered. Though the beryl crystals appear to be more

abundant here than in pegmatite dikes in the nearby Coahuila area, their relatively small size would make concentration by current (1962) techniques difficult.

Development: By late 1959 a short access road and a shallow prospect pit comprised the only development.

Production: None.

References: Wright, 1946, p. 9-13, pl. 1.

R.B.S. 10/22/59

Bismuth

The only recorded production of bismuth in California was from Riverside County in 1904. In that year 20 tons of bismuth ore were reported (Chesterman, 1957, p. 79) from the Lost Horse mine (see herein under gold). Murdoch and Webb (1956, p. 79) list bismuthinite (Bi_2S_3) as found at the Lost Horse mine, but this occurrence is not documented.

CLAY

Clay

Clay

The southwestern part of Riverside County contains the oldest and most productive clay district of southern California -- the Alberhill-Temescal Valley-Corona district. The clay deposits, of which this district is a major part, crop out discontinuously in Riverside and Orange Counties in an irregular, rather narrow, horseshoe-shaped belt, the ends of which point southeast. In Riverside County the deposits lie in a belt about 20 miles long that extends northwest from Elsinore to Corona along the Temescal Trough. The deposits are parallel to and bounded on the southwest by the Elsinore fault zone along the east flank of the Santa Ana Mountains. On the northeast the deposits lap up onto the edge of the Gavilan Hills. From Corona the deposits extend around the northwest tip of the Santa Ana Mountains into Orange County and thence south-eastward on the west flank of the mountains across Trabuco Canyon to the Tierra Colorado clay district in southeastern Orange County.

The clays in the district are both residual and sedimentary. Most of the clay probably was originally derived from weathered surfaces of Jurassic(?) or Cretaceous hypabyssal intrusive rocks. Less abundant are clays that have weathered from Triassic and/or Jurassic argillites and slates. Elsewhere in the Santa Ana Mountains Cretaceous shales may have been a source of clay. Residual clays have developed in place by subaerial chemical weathering of aluminum-rich rocks which, in the Alberhill region, include: quartz latite porphyry; quartz latite volcanic breccia; Santiago Peak Volcanics, latite to andesite; mixed gabbro-diorite; and Bedford Canyon Formation slates. These clays are of two general types: white, yellow, buff, gray, and red mottled claystone; and white, yellow, and red pisolitic claystone.

The sedimentary clays are commonly associated with lignite and are found near the base of the Paleocene Silverado Formation. Apparently they were derived from the residual clays and deposited unconformably on Cretaceous and older rocks, or on the weathered materials derived from them.

The sedimentary clays differ from place to place but are of four general types: red and white or yellow and gray mottled claystone; gray to brownish red or yellowish green pisolitic clay (locally called "bone clay" or "bauxite"); gray sandy claystone; and white or gray to black, fine-grained, dense kaolinite with a conchoidal fracture (locally called "flint fire clay", or "fire clay").

In 1963 about 20 pits were active, but some of these are mined only intermittently. From 1894 to 1962 a total of about 8 million tons of clay valued at more than 12 million dollars is reported to have been produced in Riverside County (see fig . ___/). These figures, however, are not complete as prior to 1949 they do not include clay ^{used} ~~and~~ to manufacture brick and hollow tile which from 1898 to 1949 was reported either separately or under unapportioned. Almost all of the reported clay production was mined from the Elsinore-Alberhill-Corona area and the greatest portion came from the Alberhill area. In recent years total production of all types of clay from the Alberhill-Temescal Valley-Corona district probably has been on the order of 250,000 tons each year. This region of Riverside County contains the largest known deposits of commercial clay in southern California.

In the desert area of Riverside County several deposits of sedimentary silty clay have been explored, but none have been placed in production. The best known of these are the Red Top deposit a few miles east of Thermal and the Palen Mountains deposit on the southwest flank of those mountains.

Alberhill Coal and Clay Company

See: Pacific Clay Products Alberhill Mines.

Clay

Bedford Canyon (Corona) Clay Deposit

Location: N $\frac{1}{2}$ sec. 16, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 5 road miles southeast of Corona, on the west side of Temescal Wash in lower Bedford Wash.

Ownership: International Pipe and Ceramics Corporation, 2901 Los Feliz Boulevard, Los Angeles 39 (P.O. Box 578, Corona) own about 160 acres in an irregular shape in the N $\frac{1}{2}$ sec. 16.

History: This deposit was discovered in August 1954 by geologists of Gladding, McBean and Company who were engaged in an intensive exploration program. After core drilling the property, construction of a plant for the manufacture of red-burning clay products began in July 1956, and it was placed in operation on January 1, 1958. The plant has since been in continuous operation. In 1962 Gladding, McBean and Company merged with the Lock Joint Pipe Company of East Orange, New Jersey to form the International Pipe and Ceramics Corporation.

Geology: The deposit includes both residual clay and sedimentary clay of the Paleocene Silverado Formation; the two clay zones are separated by poorly indurated arkosic sandstone. The beds appear to strike about N. 20° W. and dip from 8° to 15° southwest. The sequence, as exposed in the pit in October 1955, is given below.

Unaltered, fine-grained, blackish-gray hornblende diorite grades upward through progressively more altered rock, but with igneous texture recognizable, and finally into red mottled residual clay without recognizable igneous texture. This zone is mostly red with some buff colored pods and ranges from 5 to 20 feet in thickness, with an irregular and discontinuous pisolitic zone at the top as much as 4 feet thick. The top of the residual clay is an undulating erosion surface which is overlain by 5 to 15 feet of tawny to buff, medium to coarse, poorly consolidated arkose which contains much mica. The lower part of the arkose contains sparse, irregularly shaped, cobble-sized clasts of red mottled residual clay and a thin, discontinuous basal conglomerate with pebbles and cobbles of quartz.

Overlying the arkose are 10 to 15 feet of red mottled sedimentary clay with some white, gray, and buff colored pods. Bedding is not discernible and the sedimentary clay has the same appearance as the residual clay. In places, a thin zone of altered conglomerate lies at the base of the sedimentary clay. This zone contains light colored angular cobbles of altered igneous rocks and is cemented with a red, sandy, pisolitic clay matrix. The top of the sedimentary clay is a gray to buff or tawny colored pisolitic zone from 1 to 5 feet thick. In places the uppermost part of this zone has been bleached to nearly white. The sedimentary clay is overlain by 10 to 100 feet of buff to gray and white, poorly indurated, fine to medium, arkose which contains abundant grayish-green mica.

Both the red matrix material and pisolitic inclusions of the upper part of the sedimentary clay are chiefly kaolinite as indicated by X-ray diffraction analysis. Most of the deposit is common red-burning clay but the pisolitic material which comprises a small part of the total thickness appears to be a low-grade fire clay. The operator recognizes and blends five or six different pit clays.

Development: About 100,000 cubic yards of overburden were removed in 1955 in developing the exploratory pit. Subsequent mining has been periodic, with sufficient clay being stockpiled to supply the plant for many months. Mining is carried on with bulldozers, rippers, scrapers, and tournapull-type equipment. The pit is about 700 feet long in a north-south direction, 200 to 300 feet wide, and 125 feet deep.

The Bedford clay is blended with clays from the company's Sloan pit at Alberhill and their Harrington and Atlas pits in Temescal Valley, and several filler clays. These include Silverado Formation clay shales from the Thomas Clay deposit (described herein), clay shale and clayey sand of the Sycamore Canyon member of the upper Miocene Puente Formation from the Pomona Brick Company's Strona pit on the northeast flank of the Chino Hills (sec. 1, T. 3 S., R. 8 W., S.B.M.), and waste pond material from the nearby Owens-Illinois ^{sand} ~~rock~~ plant.

In addition to clay used in the manufacture of clay products, the mining operation yields mineral materials for another industry. In recent years buff sand, sandy clay, and pisolitic clay ("bone" clay) from the Bedford Canyon clay deposit have been marketed to several cement companies for use in the manufacture of portland cement.

The plant includes a 420-foot tunnel kiln and 8 periodic or "beehive" kilns. Buildings include bulk clay and grog storage bins; grinding and screening building with two 10-foot grinding pans; a structure housing seven auger presses and 16 horizontal and vertical dryers; laboratories and offices; lunch room and locker building; and main offices. The plant manufactures vitrified clay pipe for sewer lines and storm drains and multiple duct vitrified clay conduit for telephone and power lines.

Production: Initial rated plant capacity was 6,000 tons per month. By 1963 the plant had not undergone any major changes.

References: Stauffer, 1946, map Station 32; Ceramic News, August 1956, p. 17; Ceramic News, November 1956, p. 21-22; Gray, 1961, p. 69-71, 110.
C.H.G. 6/20/63.

Brown Star Claims

See: Middlesworth Clay deposit.

Cajalco Pit

Location: N $\frac{1}{2}$ sec. 16, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; 5 miles southeast of Corona on the east side of Temescal Wash, south of Cajalco Road along the east side of the railroad.

Ownership: Louis A. Weisel, and other, La Habra, own patented ranch land in this area (1957).

History: Leased and developed by Pacific Clay Products for a short time in the early 1930's. Idle since 1938.

Geology: Residual red mottled clay derived from Bedford Canyon Formation argillites and/or slates; bright brick-red clays about 30 feet thick grade laterally into mottled grayish-green clays and gray clays, thence into unaltered argillites. Overlain unconformably by poorly indurated sandstone (Silverado Formation) and terrace material, 0 to 25 feet thick.

Development: Irregular quarry about 100 feet long, 10 to 30 feet high. Old mine rails may mark sites of 2 small adits, now obliterated. This deposit apparently has very little areal extent beyond the quarry limits.

Production: Undetermined, but apparently small.

References: Gray, 1961, p. 110.

C.H.G. 9/1/60.

Castillo's deposit

See: Castillo's deposit under coal.

Chocolate Drop Deposit

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 17, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3 $\frac{1}{2}$ miles southeast of Corona at the south margin of the El Cerrito Hills.

Ownership: Francis A. Stearns, Box 262, Corona (1957).

History: Pit opened in 1948 by Liston Brick Company. Intermittently active since as a source of material used in the manufacture of common red brick by Liston Brick Company.

Geology: Pale gray, diatomaceous, clay shale is mined from a low isolated hill composed of upper middle Miocene shale (Topanga Formation).

Development: Material is scraped from hillslope and stockpiled by International TD9 combination bulldozer-loader; sparse limy concretions are removed by hand sorting; clay shale is loaded on small dump trucks and transported about 1 $\frac{1}{2}$ miles to Liston Brick Company.

Production: Small tonnage mined each year since 1948.

References: Gray, 1961, p. 110.

C.H.G. 8/15/62.

Conduit Clay Placer

Location: SE $\frac{1}{4}$ sec. 32, SW $\frac{1}{4}$ sec. 33, T. 3 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; in the north-eastern foothills of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona.

Ownership: Two patented placer claims (Conduit Nos. 1 and 2). Riverside Cement Co., P.O. Box 832, Riverside owns Conduit No. 1 (132 acres) and south 40 acres of Conduit No. 2. Ray and Irma B. Overacker, 412 Olive St., Huntington Beach own north 22 acres of Conduit No. 2 (1957).

History: The area was prospected for clay about 1900 and the property was patented in 1917. Apparently there has been little or no mining on these claims but in 1956 Riverside Cement Company extensively explored the property by bulldozer cuts.

Geology: Sandy to very sandy clay shales of the Upper Cretaceous Ladd Formation underlie this area.

Development: Bulldozer cuts and shallow pits.

Production: Apparently none.

References: Gray, 1961, p. 110.

C.H.G. 2/27/61.

Corona Clay Deposit

See: Bedford Canyon Clay deposit.

Corona Clay Pit

Location: N $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 26, T. 4 S., R. 6 W., S.B.M., Lake Mathews quadrangle, 7 $\frac{1}{2}$ ', 1953; about 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash at the western margin of the Gavilan Hills; half a mile north of Arcilla Siding.

Ownership: Riverside Cement Company, Division of American Cement Corporation, mill office, P.O. Box 832, Riverside.

History: The Alumina placer mining claim of 74.23 acres was patented to Ira J. Coe in 1917 and acquired by Riverside Cement Company before 1925. The area was prospected for fire clay by means of short adits in the early 1900's and probably a small tonnage of clay was mined for use in cement manufacture at some unknown period before 1945. The property was inactive for many years but in 1960 large scale open pit mining was started by the Riverside Cement Company who also mine the contiguous Atlas pit as part of the same operation. The pit continued to be actively mined in 1963.

Geology: The western part of the property is underlain by Jurassic(?) quartz latite porphyry. The eastern part of the property is underlain by a band of residual claystone derived by weathering of the Triassic(?) Bedford Canyon Formation which is overlain by the Paleocene Silverado Formation (upper part) and capped by Quaternary terrace deposits. The clay-bearing sequence strikes easterly and dips northerly. The sequence exposed in the pit in January 1963 included: basal residual high silica red mottled clay, 130 feet maximum thickness; grades upward into "bone" clay, maximum thickness 30 feet, part of which is high alumina clay; overlain by soft Silverado Formation green clay shale and micaceous arkose; overlain by about 80 feet of sandy conglomerate and bouldery terrace deposits. Sequence dips 15° to 30° northerly in most exposures, but is nearly flat lying in places.

Development: Pit is a side hill cut about 1,500 feet long east-west and 300 feet wide with three main bench levels, each about 50 feet wide with face 20 feet high. Stripping is done with tournapull equipment and bulldozers, clay is then loosened and stockpiled by Caterpillar D-8 equipped with ripper and bulldozer. Caterpillar front-end loader then loads clay directly into truck-trailer units for transport to several plants. "Bone" clay goes to Oro Grande plant of Riverside Cement Company and part of the red mottled clay goes to their Crestmore plant. Red and gray mottled clay from east end of deposit (and contiguous Atlas pit) goes to Corcna plant of International Pipe and Ceramics Corporation.

Production: Total undetermined, early in 1963 probably about 200 to 300 tons per day.

References: Dietrich, 1928, plate 10 facing p. 162; Stauffer, 1946, map Sta. 27.

C.H.G. 1/24/63

Corona Placer (Lord?) Deposit

Location: NW $\frac{1}{4}$ sec. 14, T. 4 S., R. 7 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeast margin of
the Santa Ana Mountains, west side of Main Street Canyon,
3 $\frac{1}{2}$ miles southwest of Corona.

Ownership: A. E. Gahahl, 1011 Victoria (P.O. Box 643)
Corona (1957).

History: May include at least part of the clay and
mineral paint deposits worked by George W. Lord and
others about 1900 (Aubury, 1906, p. 223, 339). The
property has long been idle, except for annual assess-
ment work.

Geology: The deposits are thin, discontinuous, red
mottled and pisolitic "bauxitic" clays of the Paleocene
Silverado Formation intercalated with clay shale,
arkosic sandstone, and conglomerate. The Silverado
beds strike northwest and dip steeply southwest, or are
vertical. In general the deposit is believed to be
similar to, and an extension of, the adjoining Middles-
worth deposit (described herein). Tucker and Sampson
(1945, p. 161) reported a bed of "blue fire clay" said
to be 20 feet thick with 10 to 20 feet of overburden.
However, in 1957 fire clay was not exposed and clay
reserves appeared to be small.

Development: By 1914 the property had been developed by two open cuts and two adits, each about 100 (?) feet long. These workings were inaccessible in 1957.

Production: G. W. Lord is reported to have produced gray fire clay, about 1905, which probably was mined from this property and the adjoining Middlesworth deposit. Amount of production is not known, but probably was not large.

References: Aubury, 1906, p. 223, 339; Tucker and Sampson, 1945, p. 161; Gray, 1961, p. 71, 110.

C.H.G. 8/15/62.

Corona Shale Mine, Pacific Clay Products

See: Sky Ranch Clay Company deposits and Wardlow shale mine.

Douglas Pit*

*Adapted from Engel and others, 1959, p. 95.

Location: NE $\frac{1}{4}$ sec. 22, T. 5 S., R. 5 W., S.B.M., Alberhill quadrangle, 7 $\frac{1}{2}$ ', 1954; north of and adjacent to the West pit of the Alberhill Mines of Pacific Clay Products, half a mile southeast of Alberhill Post Office (see. fig. 3-1).

Ownership: Pacific Clay Products, 1255 West Fourth Street, Los Angeles.

History: Clay deposits in the Douglas pit were first mined in the period 1885-1890. In the early operations, sedimentary fire clay comparable to the Sh-3 clay that overlies the lignite in the West pit (Alberhill Mines) was mined from the Douglas pit. This layer of fire clay was mined out at some time after 1930. Later, and until about 1955, red and white mottled plastic clay was mined from the Douglas pit for use in the production of sewer pipe. Immediate pit area apparently was exhausted in 1955 and the pit has since been inactive.

Geology: Red and white mottled plastic clay, probably consists of both residual material and of sedimentary material near the base of the Silverado Formation. See figs. G-1, G-2, and table ^{G-1} for details. Plate 6 of Engel and others (1959) shows the geology of the area.

Development: Open pit, the northern half of the West pit which is rectangular in shape and about 1,700 feet by 270 feet and 80 feet deep.

Production: Undetermined, but formerly one of the principal pits in the Alberhill area. Inactive since 1955.

References: Dietrich, 1928, p. 176-177; Tucker and Sampson, 1929, p. 501; Sutherland, 1935, p. 75; Engel and others, 1959, p. 95, 131, figs. 6, 7, table 1, plate 6. C.H.G. 6/20/63.

Dutch Placer

See: Kroonen Clay deposit.

Eagle Canyon (Fraser) Clay Deposit

Location: SW $\frac{1}{4}$ sec. 13, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains 4 miles south of Corona, on the west side of Eagle Canyon.

Ownership: T. A. and F. M. Fraser, 718 Howard Street, Corona, own the Eagle group of unpatented placer claims (1957).

History: This deposit is part of the Eagle Canyon gypsum deposit (see herein) which has been mined intermittently for agricultural gypsum since 1913. In 1944 Dr. Leon Katz, San Fernando, shipped several truck loads of "fire" clay to several plants in Los Angeles. This clay was tested for flue tile, but proved to be unsuitable. Apparently the property has been idle since 1944.

Geology: Sandy clays and clay shales of the Paleocene Silverado Formation.

Development: Shallow prospect pits and small open-cuts.

Production: Undetermined, but small.

References: Gray, 1961, p. 111.

C.H.G. 2/27/61.

Elsinore Clay Company (Morton) Clay Deposit

Location: NE $\frac{1}{4}$ sec. 31, T. 5 S., R. 4 W., S.B.M.,
Elsinore quadrangle, 7 $\frac{1}{2}$ ', 1953; astride State Highway
74, 1 $\frac{3}{4}$ miles north of Elsinore.

Ownership: Elsinore Clay Company, P.O. Box 104,
Murietta.

History: Deposit first mined by the Morton Clay
Company in the early 1920's, apparently both from shafts
and open pits. About 1930 the property was purchased
by the Elsinore Clay Company which has intermittently
mined the deposit since that time (Engel and others,
1959, p. 92). In recent years this deposit has been
a source of red-burning clay for several common brick
manufacturers, including the Hancock Brick Company,
Highgrove, and Phoenix Brick Company, Phoenix, Arizona.

Geology: Lignite and refractory carbonaceous clay-
stone, and gray to buff clay shale of the Silverado
Formation are exposed in the pits. For details see
figures G-1/, G-2/, and table G-1/. In January 1963, the
sequence exposed in the largest and apparently most re-
cently active pit was 10 to 20 feet of red soil overburden
and 25 feet of gray sandy clay with purple mottled clay
at base.

Development: Four open pits west of Highway 74. The northernmost pit (Laura Ward pit), apparently inactive since the late 1950's, is elongate triangular in plan about 400 feet by 150 feet and 40 feet deep. The largest pit, opened in recent years and apparently the only pit active in 1963, is in the southwestern part of the ^{in the area earlier developed by the Ed no. 2 pit} property. This rectangular pit is about 500 feet long, 300 feet wide, and 50 feet deep. Mining is done intermittently by machine methods and the clay is stockpiled for use as needed. A fifth pit was opened about 1954 east of Highway 74, but has been inactive for several years. Only clay shale and micaceous arkose of the upper part of the Silverado Formation are exposed in this pit.

Production: Undetermined, probably a few thousands of tons each year in recent years.

References: Tucker and Sampson, 1929, p. 501; Sampson, 1935, p. 520; Tucker and Sampson, 1945, p. 161; Stauffer, 1946, map Sta. 5; Engel and others, 1959, p. 92, 130, figs. 6, 7, Table 1.

C.H.G. 1/9/63.

Emsco

See: Harrington Pit.

Emsco Pit

Location: SE $\frac{1}{4}$ sec. 33, T. 3 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 miles southwest of Corona, on the east bank of Wardlow Wash.

Ownership: Mrs. Graciosa and Bernard W. De Pipkins, Harvard Street, Los Angeles (1956).

History: The Emsco pit was opened in 1937 by the Emsco Refractories Company, South Gate and a few hundred tons of high refractory clay were shipped to their South Gate plant. Mining ceased about 1940 and in 1956 the remaining adit and dump were destroyed by construction of a pipeline.

Geology: Gray, Sandy, carbonaceous high refractory clay of the Paleocene Silverado Formation. Clay zone reported to be about 8 feet thick, dipping 45°± east.

Development: First mined in 1937 from open quarry by power shovel, but open pit mining proved impractical because of steep dip; later an adit was driven N. 50° E. about 250 feet south of the quarry and some clay was mined. In 1950 the clay zone was not found in the quarry and the adit was inaccessible. Lignite, carbonaceous clay, and impure reddish-brown sandy clay were in the dump.

Production: Undetermined, but apparently small.

References: Gray, 1961, p. 111.

C.H.G. 2/27/61.

Findley Feldspar Placer

Location: SE $\frac{1}{4}$ sec. 33, T. 3 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, about 3 miles southwest of Corona, along the west bank of Wardlow Wash.

Ownership: Ray and Irma B. Overacker, 412 Olive Street, Huntington Beach own two patented placer claims (Findley Feldspar nos. 1 and 2) (1957).

History: This may be the location of one of the glass sand deposits noted by Aubury (1906, p. 375) as under development by the Corona Pressed Brick Company, about 1905. The property is said to have yielded a considerable tonnage of clay about 1920 used in brick plants in the Los Angeles area. It has been idle since long before 1938, when acquired by the present (1957) owners.

Geology: Pods and irregular stringers of red, white, and gray mottled, and white and purple mottled clays in a matrix of weak, coarse, white arkose of the Paleocene Silverado Formation with some cobble conglomerate; sandstone beds strike N. 70° E., dip 30° NW.

Development: Explored by several open-cuts; perhaps also by underground workings, now caved.

Production: Undetermined.

References: Aubury, 1906, p. 375; Gray, 1961, p. 111.
C.H.G. 2/27/61.

Findley Graphite Placer Mine

Location: NW $\frac{1}{4}$ sec. 4, T. 4 S., R. 7 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank
of the Santa Ana Mountains, about 3 $\frac{1}{2}$ miles southwest of
Corona, north of Wardlow Canyon.

Ownership: Omar Short, Santa Ana owns one patented
placer claim (Findley graphite placer) (1957).

History: Explored about 1900 by shallow open cuts and
one adit said to have showings of "graphite"; not found
in 1956. In the late 1940's, the clay zones were pros-
pected by bulldozer cuts.

Geology: Thin discontinuous zones of impure red and
green sandy clays occur in the shear zones in sandstone
and conglomerate of the Upper Cretaceous Ladd Formation.

Development: Shallow open-cuts and bulldozer cuts.

Production: Undetermined.

References: Gray, 1961, p. 111.

C.H.G. 2/27/61.

Fire Clay Group

Location: Secs. 4, 5, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7½', 1954; northeastern flank of the Santa Ana Mountains, 3½ miles southwest of Corona, along both sides of Mabey Canyon.

Ownership: Sky Ranch Clay Company (Clifford Tillotson, owner) P.O. Box 237, Corona, owns 3 patented placer claims (Fire Clay no. 1, Fire Clay no. 2, M. & M. placer) (1957).

History: This property was explored for clay before 1910, but production from this period is undetermined. About 1950, the Sky Ranch Clay Company (see herein) mined a small tonnage of clay shale from an open-cut. Idle since about 1950.

Geology: Clay shale of the Upper Cretaceous Holz Shale Member of the Ladd Formation.

Development: By 1910, the property had been explored by 4 short adits and 7 open-cuts. In 1956, the principal idle working was a small open-cut hillslope.

Production: Undetermined.

References: Gray, 1961, p. 78-80, 111.

C.H.G. 2/27/61.

Fraser Clay deposit

See: Eagle Canyon clay deposit:

Freeman Clay

Location: Undetermined, probably various deposits between Main Street and Hagador Canyons, Corona South quadrangle, 7½', 1954; northeastern flank of the Santa Ana Mountains, about 3½ miles southwest of Corona. (See Middleworth clay deposit and Corona clay placer, herein).

Ownership: Undetermined.

History: G. R. Freeman, Corona, reported some clay production from the Corona area during the 1920's.

Geology: Clay-bearing Paleocene Silverado Formation sandstones and siltstones crop out in this area.

Development: Undetermined.

Production: Undetermined.

References: Gray, 1961, p. 77-78, 111.

C.H.G. 2/28/61.

Gladding, McBean and Co., Corona Plant

Location: NW¹/₄ NW¹/₄ sec. 16, T. 4 S., R. 6 W., S.B.M.,
Corona South quadrangle, 7¹/₂', 1954; in lower Bedford Wash
near Temescal Canyon, 5 road miles southeast of Corona on
State Highway 71.

Description: Manufacturers vitrified clay pipe and
conduit (see Bedford Canyon (Corona) clay deposit herein).

References: Gray, 1961, p. 69-71, 114.

C.H.G. 3/2/61.

Map

Grapevine Clay Mine

Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 4 (lot 9), T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3 miles southwest of Corona on the south side of Mabey Canyon.

Ownership: Mrs. Mary A. Matthey, 11359 Biona Avenue, Los Angeles 66 (1957).

History: First active from about 1900 to 1910. In 1906 the California Portland Cement Company removed some "cement rock" and about 30,000 tons are said to have been shipped to their Colton plant. From 1908 to 1910 the Corona Pressed Brick Company is reported to have used clay shale from this deposit in their manufacturing plant located west of Corona. After 1910 the property remained idle except for development work, until about 1950 when Joe Deleo, Jr., Corona, mined some clay shale. Starting in 1953 the Sky Ranch Clay Company began mining this clay shale for use by the Tillotson Refractories Company in Corona. Mining continued through 1955, but by November 1956 the property was inactive and has remained idle.

Geology: The clay occurs as a clay shale unit in a narrow lens of the Holz Shale member of the Upper Cretaceous Ladd Formation. This lens of Holz Shale, about 3,500 feet long and as much as 500 feet wide, crops out along the abruptly rising south side of Mabey Canyon. The shale strikes about N. 60° W. and dips 65° NE., or is vertical. The Grapevine claim covers only about 1,000 feet of the strike-length along the central part of the shale, the remainder on each end being part of the Sky Ranch Clay Company holdings (described herein).

Development: Several short exploratory adits and open cuts. Three adits were driven during early development operations; one is now caved at the portal, two others are 50 and 60 feet in length. Recent mining was done by benching with bulldozer, ripper, and scraper, the loosened material being pushed into a small storage bunker for loading into small trucks.

Production: About 350 tons per month during 1955. Total production unknown, probably several tens of thousands of tons.

References: Gray, 1961, p. 72-73, 111.

C.H.G. 8/15/62.

Harrington (Emsco) Pit

Location: E $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 26, NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T. 4 S., R. 6 W., S.B.M., Lake Mathews quadrangle, 7 $\frac{1}{2}$ ', 1953; about 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash at the western margin of the Gavilan Hills, three quarters of a mile northeast of Arcilla Siding.

Ownership: Stuart Findley, Huntington Park. About 20 acres in the southwest part of the pit area is leased to the Corona Clay Company, 1233 Garretson, Corona; the remainder of the property is leased to International Pipe and Ceramics Corporation, 2901 Los Feliz Blvd., Los Angeles 39.

History: The original Harrington pit area was 81.80 acres in section 26, but in 1963 the area includes an unknown, but apparently small acreage in section 25. As early as 1905 clay was being mined from the Harrington pit area by the Independent Sewer Pipe Company for shipment to Tropic (Los Angeles area). By 1920 the property was under lease to Alberhill Coal and Clay Company, but was idle. Later the pit was leased to the Emsco Clay Company who in 1926-27 were mining from a pit about 100 feet square and 40 to 50 feet deep. At that time the white plastic clay went to the Atlas Fire Brick Company and the other clays were marketed in Los Angeles, chiefly to Gladding, McBean and Company and Pacific Clay Products. Emsco Refractories Company still controlled the pit in 1942, but by 1945 the property was leased to the Temescal Clay Company who also shipped clay to the two above named companies in Los Angeles. By 1945 the pit had been enlarged to about 700 feet in diameter and a depth of 140 feet. Since about 1950 the pit has been operated by the Corona Clay Company and Gladding, McBean and Company (now part of the International Pipe and Ceramics Corporation). The pit was active in 1963.

Geology: Southern part of property is underlain by Triassic(?) Bedford Canyon Formation. Mine area, in northern part of property, is underlain by residual red mottled claystone derived by weathering of Bedford Canyon Formation; white, and red, white and buff mottled claystone with carbonaceous claystone and lignite at base (lower part of the Paleocene Silverado Formation); and green clay shale and micaceous arkose (upper part of the Silverado Formation). Clay sequence is more than 100 feet thick in places. A typical sequence is: overburden, 30-60 feet; "bone" clay, 4-6 feet; pink mottled clay, 10-15 feet; red mottled clay, 2-20 feet; white-gray plastic clay (locally termed select Harrington No. 5), 3-7 feet; red clay (locally termed Red Horse), 40-50 feet. Clay sequence dips gently north or northeasterly.

Development: Pit area is a somewhat L-shaped or semi-circular sidehill cut about 2,000 feet long east-west and 1,000 feet in maximum width with two main irregular bench levels. The north face is about 200 feet high and the south face is about 75 feet high.

International Pipe and Ceramics Corporation mines red mottled clay from their portion of the pit about once each year. Mining is done by contract with an earth-moving company. The clay is stockpiled and later hauled as needed to their Corona plant by the Corona Clay Company.

Mining by the Corona Clay Company in their portion of the pit is more or less continuous and utilizes bulldozers, rippers, tournapull equipment, small dipper power shovels, and front-end loaders. Several types of clay including white-gray plastic, dark gray plastic, red, and red mottled are stockpiled separately and are supplied to several manufacturers of clay products in western Riverside County and in the Metropolitan Los Angeles area. The dark gray plastic clay finds an unusual use in the manufacture of artificial fireplace logs. Clay is loaded directly into semi-trailer trucks for transport to market.

Production: 3 to 4 rail cars per day in 1926-27, 35 cars per month in 1945. In recent years and at present (1963) several tens of thousands of tons each year. Total production unknown, but apparently one of the larger clay mines in the Alberhill-Corona region.

References: Aubury, 1906, p. 223; Merrill, 1917 1919, p. 568; Boalich and others, 1920, p. 86; Tucker and Sampson, 1925, p. 500; Dietrich, 1928, p. 169-171; Sutherland, 1935, p. 71-72; Sampson, 1935, p. 518; Tucker and Sampson, 1945, p. 162; Stauffer, 1946, map Sta. 28.
C.H.G. 1/24/63.

Hoag Ranch deposit

See: Jones clay deposit.

Hoffman deposit

See: Jones clay deposit.

Hoist Pit*

*Adapted from Engel and others, 1959, p. 95.

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, and 10 acres in the SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 26, T. 5 S., R. 5 W., S.B.M., Elsinore quadrangle 7 $\frac{1}{2}$ ', 1953; at Durant Siding, 3 $\frac{1}{2}$ miles northwest of Elsinore (see fig. G-1).

Ownership: Pacific Clay Products, 1255 West Fourth Street, Los Angeles, owns a 50 acre block. The mine area is in a 10 acre tract which is part of the area known as the Elsinore Joint Property (see tabulated entry herein).

History: The Hoist pit was opened in about 1890. Clay mined here was transported to a plant at Terra Cotta where it was used to make sewer pipe, hollow tile building blocks, and other heavy clay products. This plant and the Hoist pit apparently were owned by the Dolbeer Estate before 1905, then by the California Fireproof Construction Company and by 1912 were owned by the Pacific Sewer Pipe Company which later became part of Pacific Clay Products. The pit was abandoned when the plant was destroyed by fire and the Pacific Sewer Pipe Company closed down in 1912. The property has not been mined since, but in recent years exploration by drilling and bulldozer cuts has been done by Pacific Clay Products. This work is reported to have established additional clay reserves.

Geology: Yellow pisolitic "bone" clay occurs as small lenses overlying red and white mottled plastic residual clay. Overburden is about 30 feet of Paleocene Silverado Formation sandstone. See fig. 4-2 and table 1-1 for details. Plate 6 of Engel and others (1959) shows the geology of the Hoist pit area.

Development: Irregular, elongate open pit 600 feet by 200 feet and 60 feet deep.

Production: Undetermined.

References: Merrill, 1917 [1919] p. 570; Boalich and others, 1920, p. 89-90; Dietrich, 1928, p. 173; Tucker and Sampson, 1929, p. 501; Engel and others, 1959, p. 95, 131, figs. 6, 14, table 1, plates 5, 6.

C.H.G. 6/20/63.

International Pipe and Ceramics Corporation
(Gladding, McBean and Co.) Alberhill District*

*Adapted from Engel and others, 1959, p. 92-93.

Location: SW $\frac{1}{4}$ and S $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 22 and S $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 21, T. 5 S., R. 5 W., S.B.M.; Alberhill quadrangle, 7 $\frac{1}{2}$ ', 1954; an L-shaped strip of land that lies north and east of and adjacent to the clay properties owned by the Los Angeles Brick and Clay Products Company. This strip, which is about half a mile south of the Alberhill Post Office, contains 5 clay pits (see fig.).

Ownership: International Pipe and Ceramics Corporation, 2901 LosFeliz Boulevard, Los Angeles 39.

History: The clay deposits developed by the three northernmost pits, referred to as the old Sloan pits, were discovered as early as 1885, but were most actively mined by the Los Angeles Pressed Brick Company and Gladding, McBean and Company during the period 1920-1929. In 1916 the Los Angeles Pressed Brick Company erected a plant for the manufacture of clay products adjacent to the Sloan pits. The plant was active until about 1930 and was later dismantled. The Los Angeles Pressed Brick Company merged with Gladding, McBean and Company in about 1926 and in 1962 Gladding, McBean and Company merged with the Lock Joint Pipe Company of New Jersey and became the

International Pipe and Ceramics Corporation. The two most southerly pits were opened in the early 1950's and the southernmost pit, now known as the Sloan Pit, is the only one of the group that was being mined in early 1963.

Geology: A regional geologic map is given by Engel and others (1959, plate 5). According to Engel and others (1959, p. 92) similar sequences of clay-bearing units are exposed in all the pits except for minor variations in lithology and thickness. The section contains little or no carbonaceous material, in contrast to Alberhill and Western pits, but all five pits apparently contain both sedimentary clays and sandstone (Silverado Formation) and residual clays. White, yellow, and red, massive, pisolitic bone clay of probable residual origin is exposed in and was mined from the three old Sloan pits. Pink and white mottled plastic residual clay underlies the bone clay in the northernmost of the old Sloan pits. A layer of sedimentary fire clay, which is less than one foot thick, overlies the bone clay in the southernmost of the old Sloan pits and the northernmost of the recent pits. In all of the pits, a layer of red and gray mottled, plastic, sandy, sedimentary clay as much as 50 feet thick overlies the sedimentary fire clay and is called the Sloan Mottle. The sequence exposed in the active Sloan Pit in January, 1963, was: buff sandy overburden, 20-35 feet; red and gray mottled clay, 25 feet; white clayey sand, 5 feet; dark red to brown "bone" clay, 10 feet; red mottled clay, 5 feet; buff sandy clay at pit bottom. See figures G-1, G-2, and table 3-1 for details of each pit.

Development: Open pits, see figure ___/ and table ___/ for details. In the early days the Sloan pits were mined by hand methods. Recent mining, however, has been almost entirely by machine methods. Mining is periodic and is done by contract, with large stockpiles prepared from which material is hauled by truck as needed. The active Sloan Pit is rectangular in plan with dimensions of about 500 feet by 600 feet and a maximum depth at the south face of 100 feet. Clay is mined from three bench levels. The Sloan Mottle is being mined for use in the production of heavy clay products at the company's plant at Corcna and a considerable tonnage of "bone" clay is sold to various cement companies for use in the manufacture of portland cement.

Production: Total undetermined. In 1963 mining was at the rate of about 50,000 tons of "bone" clay for cement company use, and about 25,000 tons of mottle clay for heavy clay products each year.

References: Aubury, 1906, p. 223; Merrill, 1917 [1919], p. 574; Boalich and others, 1920, p. 86-89; Dietrich, 1928, p. 171-174; Tucker and Sampson, 1929, p. 500; Sutherland, 1935, p. 70; Engel and others, 1959, p. 92, 93, 130, figs. 6,7, table 1.

C.H.G. 6/24/63.

Jones (Hoffman, Hoag Ranch) Clay Deposit

Location: NW $\frac{1}{4}$ sec. 19, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; 4 miles southeast of Corona, near the head of a small canyon midway between Joseph and Bedford Canyons.

Ownership: Coronita Ranch, c/o D. C. McMillan, 8704 Colima Road, Whittier (1957).

History: The Jones deposit, known in 1892 as Hoffman's coal prospect, was later part of the Hoag ranch. The owner in 1925 was A. E. Jones of Corona; later the property was acquired by Mrs. D. C. Hammond and became part of the Coronita Ranch in 1957. Local residents report the period of greatest activity as about 1900 when clay and coal were mined. The property was idle in 1925 and apparently has since remained idle.

Geology: The mine area, which is covered with dense brush, is along the northeast side of the Elsinore fault. These deposits are part of the nonmarine lower facies of the Paleocene Silverado Formation. The strata now exposed in the mine area are white arkosic sands, sandy buff to gray claystone, cobble conglomerate, and tawny and gray fissile claystones which strike northwest and dip about 30° southwest; the beds are overturned. The commercial clay zone is not exposed but presumably occurs

below the white arkose. Tucker and Sampson (1929, p. 500-501) describe the clay in the workings as a gray, plastic clay bed about 6 to 8 feet in thickness, dipping southwest about 20°. Thin coal seams occurred on both the top and bottom of the clay bed. The coal seam at the outcrop was from 4 to 10 inches thick and is reported to have been 4 feet thick in old workings 90 feet from the surface.

Development: According to Tucker and Sampson (1929, p. 500-501) the principal mine workings were at the head of the canyon and consisted of 4 adits ranging from 70 to 180 feet in length. These adits were driven on the two coal seams. In 1956 all of the workings were badly caved and only several old mine rails and some scattered dump material mark the site.

Production: Undetermined, but probably was small and the coal is said to have been used only locally.

References: Tucker, 1921, p. 325; Tucker and Sampson, 1929, p. 500-501; Sampson, 1935, p. 520; Gray, 1961, p. 73, 112.

C.H.G. 8/15/62.

Keno Group

See: Kroonen clay deposit.

Kroonen (Keno Group, Dutch Placer) Clay Deposit

Location: S $\frac{1}{2}$ sec. 4; NE $\frac{1}{4}$ sec. 9; NW $\frac{1}{4}$ sec. 10, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3 miles southwest of Corona, west of and adjoins the McKnight mine, between Tin Mine and Mabey Canyons.

Ownership: Mary L. Kroonen, 708 West Eighth Street, Corona owns eight patented placer claims totaling about 150 acres (1957); John Tillotson, 807 Park Lane, Corona, owns one placer claim (Leo Lorenzo, 20 acres) originally included in the Kroonen group(1957).

History: Probably the early exploration occurred during the same period as that at the adjacent McKnight mine, about 1890-1900. The property had been sufficiently developed so that patent was applied for in 1914 and granted in 1917. Periods of activity are unknown but this property probably furnished red-burning clay and perhaps some fire clay to several nearby clay products manufacturing plants which were active about 1900 to 1920. By 1923 this property was idle and apparently since has been idle.

Geology: In the northwest part of the deposit, where most of the mining appears to have been done, red mottled clays with good plasticity and thin lenses of dark gray, dense, kaolinite clays associated with lignite are intercalated with buff clay shales, thin-bedded micaceous sandstone, and conglomerate. The beds, which are part of the Paleocene Silverado Formation, strike northwest and dip vertically to steeply overturned to the southwest. These beds are much disturbed by faulting and form the narrow part of a wedge-shaped fault sliver of Silverado Formation sedimentary rocks. The clay beds are not well exposed but the red mottled clay may be as much as 10 feet thick and the kaolinite and lignite zones range from several inches to one foot in thickness. The lateral extent is not traceable more than several tens of feet. Reserves of clay appear to be small.

Development: Tucker and Sampson (1929, p. 501) report the property to have been developed by tunnels and open cuts. In 1956 the tunnels had been made inaccessible by caving and the cuts were slumped, but clay exposures were observed in several open cuts.

Production: Periods and amounts of production unknown, but apparently not large.

References: Tucker and Sampson, 1929, p. 501; Gray, 1961, p. 74, 112.

C.H.G. 8/15/62

Leo Lorenzo Placer

See: Kroonen Clay deposit.

Lord Deposit

Location: Undetermined. May be same as Middlesworth clay or part of Corona placer, described herein.

History: George W. Lord, Corona, reported light gray, fine-grained fire clay under development in 1905.

References: Aubury, 1906, p. 223; Gray, 1961, p. 71, 72, 78, 112.

C.H.G. 2/28/61.

Los Angeles Brick and Clay Products Company*

*Adapted from Engel and others, 1959, p. 93-95.

Location: S $\frac{1}{2}$, NW $\frac{1}{4}$, N $\frac{1}{2}$ NE $\frac{1}{4}$, sec. 21, NW $\frac{1}{4}$ ^{NW $\frac{1}{4}$} /sec. 22, and NE $\frac{1}{4}$ sec. 28, T. 5 S., R. 5 W., S.B.M., Alberhill quadrangle, 7 $\frac{1}{2}$ ', 1954; along the northern edge of a group of small hills northeast of the Santa Ana Mountains, one mile south of Alberhill Post Office. Plant located at Alberhill about one mile north of the pits.

Ownership: Los Angeles Brick and Clay Products Company, 2310 East Seventh Street, Los Angeles 23.

History: The Los Angeles Brick Company acquired their clay properties from the former owner, the California Clay Manufacturing Company, and built their plant in 1925. This plant, which has been modernized in recent years, utilizes 18 beehive kilns (inside diameter 30 feet) and three tunnel kilns in the manufacture of fire brick, face brick, sewer pipe, flue linings, and floor tile. It has been in continuous operation since 1925. In 1960 a new plant for the manufacture of common red brick was built just east of the existing plant. This brick plant utilizes modern equipment to form the brick which are fired in field kilns. The common brick plant operates only during the warmer seasons, usually from about April to October, with as many as eight field kilns. Except for the No. 1 pit which was in operation as early as 1890, all of the clay deposits have been developed since 1925. The company

Four types of clay are mined from the pits.

Yellow plastic residual clay which is the lowermost unit in Pit No. 1 is used to make sewer pipe. No. 1 fire clay is a white to dark gray, carbonaceous, refractory clay that occurs as a sedimentary layer in pits No. 1 and No. 23 and is employed in the manufacture of fire brick and flue linings. No. 1 pink is a pink and white mottled, locally sandy, plastic sedimentary clay that is used to make face brick and is mined from pit No. 1 and pit No. 7. No. 2 red which is mined from No. 2 pit is a red to yellow plastic residual and basal sedimentary clay used in the production of face brick, sewer pipe, and tile.

Development: Six open pits mined both by machine and hand methods. The Company does their own mining on a continuous basis. In 1963 most of the mining was by machine methods utilizing tournapull-type equipment, front-end loaders, small power shovels, and dump trucks. The High Power pit has been idle since about 1930 but the other five pits (No. 23, No. 7, No. 2 "Pink Mottle", No. 1, and Green) have all been recently operating. See figures 6-1 and 6-2 and Table 6-1 for pit details.

Production: Total not determined. More fire clay is mined from here than from any other deposit in the Alberhill area and during 1954 about 4,500 tons of clay were used each month in the production of clay products at the Alberhill plant. Mining apparently is continuing at about the same rate.

References: Aubury, 1906, p. 223, Merrill, 1917 1919, p. 572, 574; Boalich and others, 1920, p. 85-86; Dietrich, 1928, p. 174-176; ^{Tucker and Sampson, 1929, p. 50/;} Sutherland, 1935, p. 70; Sampson, 1935, p. 520; Tucker and Sampson, 1945, p. 160-161; Engel and others, 1959, p. 93, 130, 131, figs. 6,7,10,11, 12,13, table 1, plates 5,7.
C.H.G. 6/20/63.

McKnight Clay Mine

Location: NE $\frac{1}{4}$ sec. 9; SW $\frac{1}{4}$ sec. 3, NW $\frac{1}{4}$ sec. 10; T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; three miles southwest of Corona between Tin Mine and Mabey Canyons.

Ownership: Pacific Clay Products, 1255 West Fourth Street, Los Angeles, owns three patented placer claims (Lucky, Trio, and McKnight), and one unpatented claim (Old Shaft), totaling about 65 acres.

History: Development of the McKnight deposit began about 1885 with the discovery of coal. Coal mining proved to be unprofitable, but attention was soon turned to the associated clay beds and during 1896 J. H. McKnight was shipping 200 tons of clay per month to plants in Corona and Los Angeles. By 1905 the property had been acquired and patented by the Pacific Clay Manufacturing Company, Los Angeles; before 1915 holdings of this Company were acquired by the Pacific Sewer Pipe Company which later became the Pacific Clay Products Company, now known as Pacific Clay Products, the current owner, and the operator for many years. The property has been idle since about the middle 1930's except for small intermittent production of red-burning clay from open pits and occasional sampling. The most recent known mining was about 1952 when several hundred tons of red-burning clay were produced.

The McKnight clays occur in a fault block of sedimentary rocks of the Silverado Formation. The fault block is triangular in plan, and is about 6,000 feet long with a maximum width of 2,500 feet, bordered by Upper Cretaceous sandstone, conglomerate, and shale of the Ladd Formation, undifferentiated. The structure is further complicated by cross fractures and folding which make the clay beds difficult to mine. The Paleocene clays may rest unconformably on and be infolded with Upper Cretaceous rocks and were later disturbed by complex faulting. However, the Paleocene rocks seem to comprise a fault block. Reserves of fire clay probably are meager and those of the red-burning clay are somewhat more abundant, but no meaningful estimate of clay reserves seems possible from available data.

McClintock Pit

Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 4, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 miles southwest of Corona, on the north side of Mabey Canyon.

Ownership: Pacific Clay Products, 1255 West Fourth Street, Los Angeles (1961).

History: In 1952, this property was under development by Earl M. McClintock, who in 1952 furnished a small amount of clay for use in the manufacture of sewer pipe to the Mission Clay Products Corporation, Olive. Later the property was acquired by the Sky Ranch Clay Company, Corona, and the area was prospected in 1956 by bulldozer work. In 1957, the property was purchased by Pacific Clay Products and has since been idle.

Geology: Red mottled sandy clay lenses in Paleocene Silverado Formation sandstone and conglomerate.

Development: Shallow open-cuts and bulldozer cuts.

Production: Undetermined.

References: Gray, 1961, p. 112.

C.H.G. 2/23/61.

Production: Output in 1925 was 50 tons per day each of red-burning and fire clay. Total production is not known, but judging from the extent of workings and fragmentary reports, a large tonnage of both red-burning claystone and fire clay must have been produced over a period of activity spanning nearly 50 years.

References: Goodyear, 1888, p. 505; Crawford, 1896, p. 616; Aubury, 1906, p. 224; Merrill, 1917 1919, p. 569-570; Boalich and others, 1920, p. 89-90; Dietrich, 1928, p. 179, 277; Tucker and Sampson, 1929, p. 502; Sampson, 1935, p. 520; Sutherland, 1935 p. 75-79; Gray, 1961, p. 74, 77, 112.

C.H.G. 8/16/62.

Geology: This deposit is in the sedimentary clay series of the Paleocene Silverado Formation, and includes iron-stained clay shale, red mottled clay, and gray fire clay. The clay beds crop out in several open pits and cuts on a low, brush-covered hill along the south side of Kroonen Canyon. The clay sequence is not completely exposed, but fragmentary exposures and previously published descriptions suggest that the McKnight sequence is similar to the sedimentary sequence at Alberhill. According to Dietrich (1928, p. 179) the McKnight deposit consisted of two principal layers of commercial clay; an upper layer, 60 feet thick, of red-burning material, used in the manufacture of common clay products; and a lower layer of fire clay, 30 feet thick, used for fire brick. Results of extensive laboratory tests of these two clay types are given by Dietrich (1928, p. 277). The clay deposits are intercalated with sandstone and conglomerate. They are underlain by green, buff, and reddish-brown sandstone and overlain by clay shale which is stained pink or red by iron oxides. According to Sutherland (1935, p. 77) this shale was used early as red-burning clay, but most of the mined clay was a flint-fire clay, moderately sandy and well-indurated and containing various proportions of very fine-grained, gray to black, disseminated carbon.

Geology: The clays crop out in bulldozer cuts and pits adjacent to the Elsinore fault in the steeply rising foothills of the Santa Ana Mountains. The clays exposed are sandy clays and semi-plastic clays of the nonmarine part of the Paleocene Silverado Formation, and consist of two principal types — a greenish-brown pisolitic "bauxite", and a semi-plastic red "pottery clay" with a conchoidal fracture. Folding and faulting have deformed the clay beds and the Silverado Formation but the Silverado beds have a general northwest strike and dip from 50° to 60° NE. in the mine area. However, one bed of "pottery clay" dips about 15° SW., and the largest exposure of bauxitic clay is nearly horizontal. There appear to be three beds of "bauxite" and one bed of the red material, separated by sandy clays. The "pottery clay", the basal unit of the sequence, is reported to be from 20 to 30 feet thick and is separated by about 70 feet of sandy clay from the overlying beds of impure "bauxite" which range from 2 feet to a maximum of about 6 feet in thickness (Tucker and Sampson, 1945, p. 161). The "bauxite" beds, averaging about 3 feet in thickness, are exposed over an area about 300 feet square. The bottom parts of the "bauxite" beds are reported to contain a dense, hard, flinty, non-plastic clay known in the industry as "bone clay". The

McVicar Pit

See: Susie Placer.

Middlesworth (Brown Star Claims, Lord?, Freeman?)

Clay Deposit

Location: NW $\frac{1}{4}$ sec. 14; SW $\frac{1}{4}$ sec. 11; NE $\frac{1}{4}$ sec. 15,
T. 4 S., R. 4 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ',
1954; about 3 $\frac{1}{2}$ miles south of Corona along the canyon (Lords
Canyon) and intervening ridges midway between Main Street
and Hagador Canyons.

Ownership: Josephine Middlesworth, 847 West 9th Street,
Corona, holds three unpatented placer claims (Good Luck,
Good Hope, Valley Brief) in the NW $\frac{1}{4}$ sec. 14 totaling
about 37 acres (1957); William H. Redding, et al.,
1008 South Pacific Avenue, San Pedro, own 105 acres of
patented ranch land (N $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 15; SW $\frac{1}{4}$ sec. 11) and
one unpatented placer claim (Red Bull No. 1, S $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 10) of about 80 acres (1957). Patented ranch land
totaling 12.5 acres in the N $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 14 was owned
in 1944 by Mrs. Mabel M. Freeman, Riverside.

Development: The McKnight property was mined mostly by underground workings which literally honey-comb the mine area (Sutherland, 1935, p. 79). By 1905 workings included four adits, with level workings totaling about 500 feet and two small open pits. Flint-fire clay was mined in 1919 from a 130-foot vertical shaft and according to Dietrich (1928, p. 179) fire clay was mined in 1925 through a lower adit 410 feet long and an upper adit 70 feet above and 500 feet to the west. The two adits were connected by a raise; clay was mined by room and pillar methods, dumped into the raise, and drawn off into small mine cars in the lower adit. The rooms were about 15 feet high and connected with an open pit and adit at a still higher level from which red-burning sewer pipe clay was being mined. Extensive workings of a similar character were to the southeast, but the clays there had been exhausted some years before 1925. Mining and loading was by hand methods. By 1945 the main workings were caved and inaccessible. In 1958 several small adits were open but showed little clay; several open pits above the old underground workings partly exposed the clay sequence.

Morton Clay Deposit

See: Elsinore Clay Company.

History: This property apparently now embraces part of several clay and mineral paint deposits operated as early as 1905 by George W. Lord and later by G. R. Freeman who intermittently produced crude clay from 1918 to 1937. Some of this production may have come from an extension of these clay deposits southeastward to Main Street Canyon (Corona Placer, described herein). By 1944, J. E. Middlesworth, Corona, held four 20-acre placer claims, known as the Brown Star claims; the patented areas were owned by the Freeman interests. In 1943, the Kaiser Steel Corporation took a short term option on the property and did considerable exploratory work in an effort to develop a source of alumina-rich clays. The property was not put into production, little exploratory work has been done since 1943, and the property remains idle.

Oak Park Clay Prospect*

*Adapted from Engel and others, 1959, p. 131

Location: NE $\frac{1}{4}$ sec. 18, T. 5 S., R. 5 W., S.B.M., Alberhill quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3/4 of a mile southeast of Lee Lake and 1,000 feet south of State Highway 71.

Ownership: Undetermined.

History: In 1946, Stauffer (map station 20) reported an "old clay tunnel or drift in fossiliferous clays"... . The prospect was apparently idle in 1946 and remained idle in 1963.

Geology: Trenches expose 5 to 7 feet of micaceous sandstone and 3 feet of greenish gray, waxy, clayey siltstone (Silverado Formation?).

Development: Two open trenches 60 feet by 15 feet and 15 feet deep.

Production: Undetermined, but apparently only a prospect with no production.

References: Stauffer, 1946, map station 20; Engel and others, 1959, p. 131.

C.H.G. 1/10/63.

average of 107 samples taken from surfaces exposed during the Kaiser investigation in 1943 was 18.9 percent alumina, 57.11 percent silica, and 5.11 percent iron oxide. About 30,000 tons of bauxitic clay averaging above 25 percent Al_2O_3 content were proved, and an additional 30,000 tons of red clay that contains less than 25 percent Al_2O_3 (Draper, 1944).

History: From about 1890 to mid-1956 the Alberhill Coal and Clay Company mined coal and clay from their deposits near Alberhill. The company did not manufacture clay products, but supplied large tonnages of high-aluminous clay to ceramic plants in the Los Angeles area. In 1956 Pacific Clay Products acquired exclusive rights to the Alberhill Coal and Clay Company deposits under a long-term operating agreement and continued the mining operation under the name Pacific Clay Products Alberhill Mines. These deposits provide the principal source of red-burning plastic clay for their plant at Los Nietos (Engel and others, 1959, p. 87-92). Since 1956 mining has been expanded considerably and two new major pits have been opened.

Development: Early development was by open cuts, shallow shafts and two adits, 150 feet in length. During the Kaiser investigation in 1943 bulldozers removed the brush and overburden and clay was exposed at a number of points; six new cuts were made, nine old cuts were cleaned, and two old adits were reopened. By 1957 these workings were again slumped and brush covered.

Production: Undetermined, but probably not large.

References: Aubury, 1906, p. 223; Draper, 1944, 11 p., map; Tucker and Sampson 1945, p. 161; Gray, 1961, p. 77-78, 112.

C.H.G. 8/16/62.

high aluminous sedimentary clay (Palocene Silverado Formation) which contains various proportions of quartzose sand, and carbonaceous clay and lignite is found in the West pit, Main Tunnel pit, and the Hill Blue Nos. 1 and 4 pits (fig. 6-1). The South Alberhill and Red and Gray Mottle pits, opened in 1961 and 1962, contain sedimentary gray and yellow plastic clays. The Red and Gray Mottle pit also exposes a 3 to 6-foot thick pisolitic lens at the base of the plastic clay. Most of the 32 differently named clays that were sold by the Alberhill Coal and Clay Company can be classified as varieties of the two main types of clay above mentioned (Engel and others, 1959, p. 91). The property in the NW $\frac{1}{4}$ sec. 26 is underlain by green clay shale with interbedded micaceous arkose of the upper part of the Paleocene Silverado Formation. This area has not been mined but recent drilling by Pacific Clay Products is said to have encountered commercial clay at depth.

Pacific Clay Products Alberhill Mines*

*Adapted from Engel and others, 1959, p. 87-92.

Location: E $\frac{1}{2}$ sec. 22, sec. 23, NW $\frac{1}{4}$ sec. 26, and S $\frac{1}{2}$ sec. 15, T. 5 S., R. 5 W., S.B.M., Alberhill quadrangle 7 $\frac{1}{2}$ ', 1954; clay pits are contained in an oval shaped area (in the E $\frac{1}{2}$ sec. 22, W $\frac{1}{2}$ sec. 23) about one mile long and half a mile wide and lie on the southwest slope of an elongate, northwest-trending hill that is bounded on the west by the Temescal Valley and on the east by Walker Canyon, about half a mile southeast of the Alberhill Post Office (see figure G-1).

Ownership: Pacific Clay Products, 1255 West Fourth Street, Los Angeles holds about 1,500 acres, formerly operated by the Alberhill Coal and Clay Co.

Geology: The regional geology is given by Engel and others (1959, plate 5) and details of the Alberhill Mines area are shown on plate 6 of Engel and others (1959). In general, the commercial clay zone as presently known is confined to the area of the mine pits, shown on figure G-1, and is about 130 feet in maximum thickness. In recent years, however, careful evaluation and drilling have revealed commercial clay in parts of the property previously thought unlikely to be clay-bearing. Thus reserves of usable clay have been greatly enlarged, but as exploration is not yet complete the full extent of the commercial clay zone is unknown. Figure G-2 is a generalized stratigraphic column showing lithologic features of the clay-bearing units in the Alberhill area and table G-1 gives information on each pit. Residual clay formed by weathering of slate (Triassic Bedford Canyon Formation) ^{and} volcanic rocks Jurassic Santiago Peak Volcanics (andesitic) and quartz latite porphyry V comprises most of the clay exposed in these pits, but both residual and sedimentary clays are produced from the Alberhill Mines deposits. Red and buff burning plastic clay of residual origin, which is used primarily in heavy clay products such as sewer pipe and face brick, occurs in the Pink Mottle pits numbers 1, 2, 3, and 4 and the No. 4 Plastic pit (fig. G-1). White to cream burning,

Development: During the early years of operation high grade refractory clays were the only clays mined. These clays, which were mined underground by hand methods, were sacked underground and shipped by rail mostly to Los Angeles producers. As late as 1930 underground mining was employed extensively, but by 1945 most of the mining was from open pits. High grade clays continued to be selectively mined by hand methods, however, until the late 1950's. The fire clays of sedimentary origin continue to be selectively mined, but in recent years this has been done by machine methods. These fire clays are sold to various users for use mainly in refractory clay products such as fire brick, furnace lining, and pottery.

In 1963 all of the active clay deposits were being mined by means of large open pits (fig. G-1/, table G-1/). Mining is done periodically by contract, usually during a few weeks in early summer. Sufficient clay is stockpiled (150,000-200,000 tons) to last about one year. In June 1963 the Griffith Company was the mining contractor and clay was mined by means of heavy-duty mechanized equipment such as Caterpillar D-8 rippers and bulldozers, Caterpillar DW641 carry-alls (40 ton capacity), and motor graders (used for stockpile work and road work). About 20,000 tons of clay were mined and stockpiled each day. Even though large scale methods are used, and the extent of each clay type is limited, careful supervision of the mining allows

each clay type to be selectively mined and separately stockpiled. Stockpiled material is loaded by rubber-tired front-end loaders as needed for transport to the Los Nietos plant by company-owned truck and trailer equipment.

Production: By 1945 the total 50-year output of clay from the Alberhill Coal and Clay Company deposits was estimated at 2,000,000 tons (Tucker and Sampson, 1945, p. 160). In 1945 about 500 tons of clay per day was being shipped from these deposits and by 1963 about 600 tons per day was being shipped.

References: Aubury, 1906, p. 221-222; Merrill, 1917 [1919] p. 567-568; Boalich and others, 1920, p. 76-85; Hill, 1923, p. 185-210; Dietrich, 1928, p. 161-169; Tucker and Sampson, 1929, p. 500; Sutherland, 1935, p. 51-87; Engel and others, 1959, p. 87-92, 129, plates 5,6, figs. 6,7,8,9, tables 1,2.
C.H.G. 6/20/63.

Pacific Clay Products De Guerre Mines

Location: N $\frac{1}{2}$ and SE $\frac{1}{4}$ sec. 27, T. 5 S., R. 5 W., S.B.M., Alberhill quadrangle, 7 $\frac{1}{2}$ ', 1954; about 1 $\frac{1}{4}$ miles southeast of Alberhill Post Office. The pits are in low hills east of old State Highway 71 in the NE $\frac{1}{4}$ sec. 27. (See fig. G-1/).

Ownership: Pacific Clay Products, 1255 West Fourth Street, Los Angeles owns 480 acres in sec. 27.

History: By 1959 the property had been explored only by one small open trench about 60 feet by 10 feet and 6 feet deep in the NE $\frac{1}{4}$ sec. 27, just east of the highway. This trench exposed white clayey sandstone overlain by gray and orange, micaceous shale of the Silverado Formation (Engel and others, 1959, p. 131). Pacific Clay Products acquired the area about 1960 and in 1961 opened a large pit; additional pits were opened in 1962 and 1963.

Geology: The surface is largely covered by Quaternary fanglomerate, but green clay shale and micaceous arkose of the Paleocene Silverado Formation crop out in the central part of the property. Engel and others (1959, plate 5) show the regional geology. The pits expose as much as 20 feet of buff sand, silt, clayey sand, sandy clay, and plastic clay, all apparently in the upper part of the Silverado Formation.

Development: Four principal pits have been opened, with the largest about 500 feet by 300 feet and 20 feet deep (see fig. __/, table __/). Mining is by large scale machine methods and is done in connection with the mining of the company's Alberhill Mines. Much of the material mined in 1963 was for experimental purposes, but the sand and sandy clay from the northernmost pit, known as "Sandy Olive" was used as a "flux" in the manufacture of sewer pipe at the company's plant at Los Nietos. In addition to the pits opened east of the old highway, the area west of the highway has been explored by drilling, which is said to have penetrated potential commercial zones.

Production: Undetermined, probably a few tens of thousands of tons have been mined.

References: Engel and others, 1959, p. 131.

C.H.G. 6/20/63.

Palen Mountains Clay Deposit

Location: Secs. 24, 25, T. 5 S., R. 17 E., and secs. 19 (proj.), 30 (proj.), T. 5 S., R. 18 E., S.B.M., Sidewinder Well quadrangle, 1952; on the southwest flank of the Palen Mountains.

Ownership: In 1945, Louis Favret and associates, Blythe, held six 160-acre placer claims in this area (Tucker and Sampson, 1945, p. 162). Present (1962) ownership was not determined.

History: Assessment work only appears to have been done.

Geology: The deposit is irregularly exposed over an area of about one square mile. It underlies the eroded surface of an undetermined thickness of inter-bedded, buff-colored silt and calcareous, bentonitic clay and is overlain by a surficial deposit of angular gravel approximately 2 feet in average thickness. Where examined, in a shallow prospect (fig. ___), the beds of silt and clay range from one inch to one foot in thickness. A bed of nodular caliche several inches thick lies about 10 feet below the upper surface of the deposit. These strata are essentially flat lying and undisturbed.

Development: The deposit has been explored through several shallow prospect pits and cuts.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 162, pl. 35.

R.B.S. 3/15/62

Peterson's Claim

Location: N $\frac{1}{4}$ sec. 29, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeast flank of the Santa Ana Mountains, about 5 $\frac{1}{2}$ miles southeast of Corona between Bedford Motorway and McBride Canyon.

Ownership: Arthur E. Garratt, 3340 Eastern Avenue, Los Angeles owns patented land, formerly railroad section (1957).

History: Some development in this area was as early as 1892 (indicated on U.S. Bureau of Land Management survey map dated 1892). About 1930, the Elsinore Clay Company, Riverside, mined small amounts of clay from open pits. The property has been inactive since the 1930's except that in 1956 bulldozer cuts were made in the NE $\frac{1}{4}$ sec. 29 in an unsuccessful effort to discover glass sand.

Geology: Red mottled clay and sandy gray to white clay with minor pisolitic zones intercalated in sandstone and conglomerate of the Paleocene Silverado Formation; adjacent to the Elsinore fault on its northeast side. Reserves of clay appear to be very small.

Development: Shallow open pits and bulldozer cuts.

Production: Undetermined, but probably small.

References: Gray, 1961, p. 112.

C.H.G. 3/1/61.

Prospect (name undetermined)*

*Adapted from Engel and others, 1959, p. 130

Location: SE $\frac{1}{4}$ sec. 14, T. 5 S., R. 5 W., S.B.M.,
Elsinore quadrangle, 7 $\frac{1}{2}$ ', 1953; on south face of hill,
about 3,000 feet northeast of Walker Ranch (see figure 7-1).

Ownership: International Pipe and Ceramics Corpor-
ation, 2901 Los Feliz Blvd., Los Angeles 39.

History: Undetermined.

Geology: Residual red and white mottled, plastic clay
derived from weathering of volcanic rocks is exposed
over surface area about 200 feet in diameter.

Development: Caved adit trends northward into hill.

Production: Undetermined.

References: Engel and others, 1959, p. 130, figure 6.

C.H.G. 6/20/63.

Red Bull Claim

See: Middleworth Clay deposit.

Prospect (Name undetermined)*

*Adapted from Engel and others, 1959, p. 132.

Location: SE $\frac{1}{4}$ sec. 16, T. 5 S., R. 5 W., S.B.M.,
Alberhill quadrangle, 7 $\frac{1}{2}$ ', 1954; half a mile northwest
of Alberhill Post Office on the north side of Temescal
Wash (see figure /).

Ownership: Undetermined.

History: Undetermined. Long inactive.

Geology: Surface exposes purplish red, plastic
residual clay derived from weathering of volcanic rocks
of Santiago Peak Volcanics.

Development: Shallow pit.

Production: Undetermined, probably none.

References: Engel and others, 1959, p. 132, figure 6.

C.H.G. 1/10/63,

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Development: The deposit has been explored through several bulldozer cuts connected by unimproved roads.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 162, pl. 35.

R.B.S. 3/15/62

Red Top Clay Deposit

Location: Secs. 20 and 21, T. 6 S., R. 9 E., S.B.M., Thermal Canyon quadrangle, 7.5', 1956; 4 miles due east of Thermal. The property is reached by unimproved, dirt roads which extend eastward to the Mecca Hills from the end of Avenue 56.

Ownership: In 1945 Louis Schrim, Los Angeles, was reported to hold 640 acres of patented land in sec. 21 and three 160-acre placer claims in sec. 20 (Tucker and Sampson, 1945, p. 162). Present (1962) ownership was not determined.

History: Assessment work only appears to have been done on these claims.

Geology: Red-brown, buff, and gray, calcareous clay underlie a northwest-trending ridge, about a quarter of a mile wide and $1\frac{1}{2}$ miles long (fig. ___/). The thickness of the deposit is obscured by folds, faults and a deeply eroded, slope-wash-covered surface. It appears to contain clay-rich units of diverse purity, some of which contain beds of silt and grit. Fracture fillings of gypsum ranging from 0 to 1 inch thick are present but not common. A few nodular masses of dense, white magnesite, ranging from 1 inch to 4 inches in diameter, were noted in prospects in the SW Cor. of the NW $\frac{1}{4}$ sec. 21.

Sievert Clay Prospect*

*Adapted from Engel and others, 1959, p. 131.

Location: SE $\frac{1}{4}$ sec. 36, T. 6 S., R. 5 W., S.B.M., Wildomar quadrangle, 7 $\frac{1}{2}$ ', 1953; in the Elsinore Mountains half a mile west of Elsinore Peak.

Ownership: Undetermined.

History: Undetermined.

Geology: Sandy residual clay formed by weathering of granodiorite is overlain by about 10 feet of red to gray buff sandstone and 2 $\frac{1}{2}$ feet of gray, sandy claystone (Silverado Formation?).

Development: Shallow pit.

Production: Undetermined, probably none.

References: Engel and others, 1959, p. 131.

C.H.G. 1/10/63.

Sky Ranch Clay Company Deposits

Location: W $\frac{1}{2}$ and SE $\frac{1}{4}$ sec. 4; E $\frac{1}{2}$ sec. 5, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3 $\frac{1}{2}$ miles southwest of Corona along Mabey and Wardlow Canyons and intervening ridges.

Ownership: Clifford and Maude M. Tillotson, P.O., Box 237, Corona, own three patented placer claims totaling 60 acres (Fire Clay No. 1, Fire Clay No. 2, and M & M placer); and three unpatented placer claims (Insight No. 1, Insight No. 2, and French placer, part of which is termed herein Sky Ranch Clay mine, east and west pits). They also own clay-bearing patented ranch land in the area. John Tillotson, 807 Park Lane, Corona, owns one patented placer claim (Leo Lorenzo, 20 acres) formerly part of the Kroonen group which is described elsewhere in this report (1957).

History: Operations in the vicinity of the patented properties began about 1900 but production apparently was small and intermittent. Following a long period of idleness a renewal of activity began about 1945 when Clifford Tillotson began developing sources of red-burning

Geology: The Sky Ranch Clay Company deposits are mostly in clay shale and siltstone of Upper Cretaceous age assigned to the Ladd Formation, undifferentiated, but the clay shale on the Fire Clay group belongs to the Holz Shale member of the Ladd Formation. The clay shales, which contain hard, irregular limy beds and concretions, in general strike northwest, dip 40° to 80° northeast and are intercalated with sandy conglomerate and massive sandstone. The principal body of clay shale that was mined crops out in a band about 500 feet wide along the north side of Wardlow Canyon and the shale can be traced northwestward along a strike length of about 1,500 feet. Large areas of the Upper Cretaceous clay shale provide many hundreds of thousands of tons of reserves of red-burning clay shale, but probably only a part of the shale will prove suitable as a constituent for the manufacture of common clay products because of sandy and limy zones and gypsum veinlets.

Development: Open cuts and short adits. The principal quarries were along the north side of Wardlow Canyon. Much of the material was mined by means of a combination bulldozer-ripper which skimmed clay shale from a broad area, rather than opening a discrete quarry.

Production: From 10 to 20 thousand tons of clay shale each year from 1945-1957.

References: Aubury, 1906, p. 223; Gray, 1961, p. 78-80, 112.

C.H.G. 8/31/62

Sky Ranch Clay Mine, West Pit

See: Wardlow Shale mine.

clays for use at the Tillotson Refractories Company in Corona. The above mentioned properties and also the Susie placer, McClintock pit, and Sky Ranch Clay Mine, west pit (all described herein) were operated collectively by the Sky Ranch Clay Company from 1945 until 1957. At that time Pacific Clay Products acquired the Susie placer, McClintock pit, Sky Ranch Clay mine west pit, and some clay-bearing patented ranch land. The Sky Ranch Clay Company ceased production in 1957, but Pacific Clay Products continued mining their properties until late 1960. The area has since been inactive.

Development: Early development was by short adits and open-cuts; recent mining has been from open pits which destroyed the earlier workings.

Production: Undetermined, but apparently small.

References: Aubury, 1906, p. 223; Gray, 1961, p. 78-80, 113.

C.H.G. 3/1/61.

Sky Ranch Clay Mine, East Pit

Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 4, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, on the north side of Wardlow Canyon.

Ownership: Sky Ranch Clay Company (Clifford Tillotson, owner), P.O. Box 237, Corona (1957).

History: Quarry opened in 1951 and until 1956 steadily furnished a considerable tonnage of clay shale to Tillotson Refractories Company, Corona. Idle since 1956.

Geology: Upper Cretaceous Ladd Formation siltstone and shale.

Development: Large open quarry.

Production: Undetermined, probably at least several tens of thousands of tons.

References: Gray, 1961, p. 78-80, 113.
C.H.G. 3/1/61.

Temescal Sixty

See: Twin Springs Prospect.

Susie Placer (McVicar Pit) Deposit

Location: NW $\frac{1}{4}$ sec. 4, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, on a ridge north of Mabey Canyon.

Ownership: Pacific Clay products, 1255 West Fourth Street, Los Angeles owns the patented Susie placer claim (1961).

History: Wm. G. McVicar shipped clay from the Susie claim to the California Clay Manufacturing Company in Los Angeles about 1900. Later the property was acquired by Earl M. McClintock who shipped some clay to Mission Clay Products, Olive, during the early 1950's. In 1954, the Sky Ranch Clay Company (see herein) acquired the property and mined intermittently until September, 1957, when Pacific Clay Products purchased the property. Idle since September 1957.

Geology: A narrow, wedge-shaped fault sliver of Paleocene Silverado Formation sedimentary clay, including red mottled, white, gray, and pisolitic clay with minor associated lignite. Intercalated with Silverado Formation sandstone and conglomerate. The deposit apparently has very little areal extent beyond the pit limits.

Thomas Clay Deposit, East Pit

Location: NW $\frac{1}{4}$ sec. 33 (proj.), T. 3 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3 miles southwest of Corona, along the east side of the major west branch of Wardlow Wash.

Ownership: Charles A. Thomas, P.O. Box 518, Corona, owns this property as part of the 500-acre La Sierra Stock Ranch; about 23 acres are leased to International Pipe and Ceramics Corporation (Gladding, McBean and Company), Los Angeles, who have sublet mining rights to the east pit area to Joe Deleo, Jr., clay supplier and mining contractor, 1233 Garretson, Corona (1957).

History: In 1951 Joe Deleo, Jr. began prospecting activities which led to the discovery of this clay shale deposit on the Thomas property. Mr. Deleo, who operates the Corona Clay Company, began mining during 1953 and each year since 1953 has maintained a small production. This red-burning clay shale is supplied to several manufacturers of common clay products in western Riverside County and Metropolitan Los Angeles area.

Switzer Deposit

Location: NE $\frac{1}{4}$ sec. 5, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; on the northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, adjoins Findley graphite placer on the east and Sky Ranch Clay Company on the south.

Ownership: Elmo Switzer, 808 West 8th Street, Corona, owns about 50 acres of patented ranch land (1957).

History: About 1945, small amounts of white, sandy clay "ganister" were mined from an open-cut by the Sky Ranch Clay Company for use at Tillotson Refractories Company, Corona. Idle since, except for occasional sampling.

Geology: Buff Upper Cretaceous clay shales of the Ladd Formation underlie the area. A white, sandy clay zone, 2 to 5 feet thick, occurs along a shear zone which strikes N. 50° W., dips 40° NE.

Development: Explored by bulldozer cuts about 1945. Small open-cut on the white, sandy clay outcrop.

Production: Undetermined.

References: Gray, 1961, p. 113.

C.H.G. 3/1/61.

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Thomas Clay Deposit, West Pit

Location: NW $\frac{1}{4}$ sec. 33 (proj.), T. 3 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 3 miles southwest of Corona, along the west side of the major west branch of Wardlow Wash.

Ownership: Charles A. Thomas, P.O. Box 518, Corona, owns this property as part of the 500-acre La Sierra Stock Ranch; about 23 acres are leased to International Pipe and Ceramics Corporation (Gladding, McBean and Company), Los Angeles.

History: Gladding, McBean and Company began development of this property in 1954. Extensive sampling, including core drilling of the clay shale, was done during 1955. The property has not been put into production, but intermittent development work has continued.

Geology: The deposit is on strike with the east pit (described herein) across the canyon and is an extension of the same deposit. In the west pit sufficient cuts have been made to show that the nearly vertical clay shale and siltstone contain intercalated cobble conglomerate and sandstone. These appear to lens out abruptly both along the strike and from side to side. The workings expose a thickness of about 400 feet of continuous clay shale.

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Temescal Tract

See: Tropico Tract.

GOLD

Gold

The earliest seemingly reliable account of gold discoveries in the southwest is that of placer deposits in the "Carga Muchacho" mining district in 1775 in what is now Imperial County (Hanks, 1884, p. 217-218). Although reports dating earlier than 1870 are scarce for the Riverside County area, it is safe to assume that prospecting and mining had been accomplished well before that date. Indeed, reference to prior Mexican development is encountered both in the literature and in the reminiscences of older residents of the mining districts. The following quote from Merrill and Waring (1917, p. 527) will serve as an illustration. It refers to the Perris region.

"Miners who worked here 40 years ago say that, at that time, in Cottonwood Canyon, was an old arrastra bottom in which was growing an elder tree 12 inches in diameter. On Redtop Mountain, in T. 6 S., R. 3 W., was found a location notice dated 1857."

In 1893, when Riverside County was created, gold dominated its mineral industry. Reported production of the yellow metal reached an all-time high in 1895 with a value of \$285,106 (@ \$20.67 per ounce). As small as this figure is, when compared even with individual mines of the Mother Lode, gold remained the county's most valuable commodity until 1902 in which year it was exceeded by brick. Gold rose to a position of importance again during the 1930's depression when, in 1936, the total value was \$216,125 (@ \$35.00 per ounce). The difference in price (which means that the 1895 figure represents a considerably greater weight of gold) is the result of an increase included in the gold reserve act of 1934 (Henderson, 1934, p. 30). The total reported value of gold mined in Riverside County is \$2,623,473.

Of the many gold mines in the county (pl. ___/)
few are reported to have yielded more than 1,000 ounces
although actual production may well exceed reported pro-
duction for many mines because of confusion arising from
changing ownership and the several different agencies,
private interests, and individuals involved in marketing
the metal. The Good Hope, with a reported yield of
as much as \$2,000,000 in gold, appears to have been the
most productive mine in Riverside County. Other mines
such as the Brooklyn, Desert Queen, Gold Crown, Lost
Horse, and Santa Rosa show good reports for some years
but in general the gold mines of the county have been
small operations where individuals or small groups of
men have found subsistence.

Most of the gold mined in Riverside County has been from quartz veins, or mineralized bodies of rock, lying in the planes of faults or less clearly defined shear zones in both granitic and metamorphic rocks. Most of the ore is free milling, the gold being associated with pyrite and chalcopyrite or the secondary iron and copper minerals resulting from their weathering. Deep weathering of the veins is common in the desert areas where water tables are generally low. Unaltered sulfides are, by the same token, generally encountered within one or two hundred feet of the surface in the Perris-Elsinore area. In both areas exceptions to this generality exist, but commonly, alteration of metal-bearing minerals has been facilitated because of fracturing of the vein material, during or following its deposition, by continued movement of the host rocks.

Placer gold has been mined in the Perris-Elsinore area (Merrill and Waring, 1917, p. 527) on land now largely inaccessible to mining because of private ownership. Deposits of gold-bearing gravel occur in the Chuckwalla Spring area (see herein) and some of the areas in and about lode-mining districts have yielded some gold to the intelligent prospector.

In past years the greatest number of individual placer operations in the county were situated in the desert area of its eastern half but the largest single yield was the 1895 total of 2,176.87 ounces from the Briggs and Hancock holdings (location and extent not determined) in the Perris area.

Some individuals turned to placer mining during the 1930's and early 40's but fortunes were meager for the reported total yield from all operations came to only 2,993 ounces of gold; just 816.13 ounces in excess of that yielded by the Briggs and Hancock holdings alone.

Alice Group

Location: Sec. 25 (proj.), T. 1 S., R. 23 E., S.B.M., Vidal quadrangle, 1950; about 4½ miles south of Vidal in low foothills at the north end of the Riverside Mountains. Tucker and Sampson (1945, p. 127) reported 12 patented claims in this group.

Ownership: Undetermined (1958).

History: According to Merrill and Waring (1916, p. 544) these claims were once known as the Pipinco Group, but by 1914 the name Alice Group had been adopted. They state that the owner at that time was one B. L. Vaughn, Needles. Tucker and Sampson (1945, p. 127-128) state that for the period from 1933 to 1939 the claims were owned and operated by the Reliance Consolidated Mining Company, E. P. Warner, president, and P. N. Warner, secretary, Banco-American Building, Los Angeles. U. S. Bureau of Mines records indicate that the Alice was active during the years 1927, 1928, 1932-34, 1937 and 1942 and list Clara Blandix, Hollywood, California, as owner and Fredrick Frie, Los Angeles, the operator, as of 1942, the last recorded date of operation.

Frederick Frie installed a 50-ton concentration and flotation plant and operated the mine until October, 1942 when operations were suspended as an affect of War Production Board Order L-208.

The mine workings are entered through 2 adits, both on the east side of the canyon. The lower adit is near the base of the slope. It was driven 490 feet southeast on a vein which is 1 to 2 feet wide at the portal. The upper adit is about 200 feet up the slope southeast of, and about 120 feet higher than the lower adit. It was driven 250 feet southeast on the same vein. An ore shoot was developed between the adits by a raise with an inclined length of 125 feet. It joins the lower and upper adits at points estimated to be about 210 feet and 50 feet from their respective portals. The shoot is exposed in the lower adit for about 125 feet with an average width of 30 inches. Ore was stoped to the upper adit, and a narrow stope was driven from there to the surface. From the lower adit, there is a winze 225 feet in depth. This was not examined but it probably explores the same ore shoot.

When visited in 1957, the Alice workings were open and dry. The road was passable. All machinery had been removed and the buildings destroyed or in poor repair. However, ore loading bins near the lower adit were still in fair repair.

Geology: The rocks in the mine area are gneiss and schist interlayered with thin beds of quartzite. They strike about N. 10° W. and dip 20° NE., but are locally contorted. Mineralized faults, which trend N. 55° W. and dip steeply to the northeast, crop out irregularly across most of the claims of the Alice group. Mafic dikes roughly parallel the faults.

The ore bodies pinch and swell and are as much as 4 feet thick. The vein material is composed of iron and manganese oxides, malachite, chrysocolla, barite, and calcite.

Development: The following description is taken in part from Tucker and Sampson (1945, p. 127-128).

cc group

The only other development noted on the Alice group is a vertical shaft of unknown depth on the Lucky Boy claim, NE 1/4 NW 1/4 sec. 25, T. 1 S., R. 23 E., about three quarters of a mile northwest of the workings described above.

Production: The Alice group was worked intermittently from as early as 1914 to 1942. From 1927 to 1942 approximately 200 tons of ore were shipped to American Smelting and Refining Company's smelter at Hayden, Arizona. From these shipments about 170 ounces of gold, 42 ounces of silver and 15,400 pounds of copper were recovered.

References: Merrill and Waring, 1917, p. 544;
Tucker and Sampson, 1929, p. 472; 1945, p. 127-128.
R.B.S. and C.H.G. 12/20/57.

The only other development noted on the Alice Group is a vertical shaft of unknown depth on the Lucky Boy claim, NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25, T. 1 S., R. 23 E., about three quarters of a mile northwest of the workings described above.

Production: In an unpublished schedule of estimated costs and realization for 1938, this company stated that total net operating profit from gold and copper for 12 months was \$166,465.80.

According to Tucker and Sampson (1945, p. 127), the estimated tonnage of ore developed in the mine was reported to be 20,000, with an average value of 0.40 ounces in gold per ton and from 1 to 2 percent copper. Shipments of siliceous ore made to American Smelting and Refining Company's Smelter at Hayden, Arizona, were reported to have averaged \$50 per ton in gold and copper.

Alice Mine

Location: At the center of the SW ^{1/4} sec. 24, T. 6 S., R. 3 W., S.B.M., Romoland quadrangle, 7 1/2', 1953; about 8 miles south of Romoland.

Ownership: Undetermined.

History: The Alice Mine was located early in the 1890's by J. R. Cheatham, L. M. Wilson and L. Crain (Mining and Scientific Press, 1895, vol. 70, p. 106). In 1894 development was reported under way, a shaft having been started in the hanging wall (Crawford, 1894, p. 221). In 1895 the mine passed into the possession of a stock company the principal members of which were J. M. S. Egan, W. H. Griffith and M. Cantan. A 5-stamp mill was installed, the shaft was reported to be down 85 feet, and 500 tons of ore were said to be ready for milling with enough in sight in the mine to keep the mill running two years (Mining and Scientific Press, 1895, vol. 70, p. 106). In 1896 all operations were reported suspended and the estate of J. M. S. Egan, Perris was the owner (Crawford, 1896, p. 310). Subsequent reports show no further activity and the Egan Estate remained the owner as late as 1945 (Tucker and Sampson, 1945, p. 127, pl. 35).

Geology: The Alice Mine is on a low, featureless, cultivated mesa of gabbroic rock. A fractured quartz vein as much as 15 feet in thickness is exposed for a strike distance of roughly 300 feet. The vein strikes N. 80° W., and dips about 35° NE. The quartz contains heavy concentrations of hematite, magnetite, and hair-like, black- to gray-green tourmaline crystals. Chalcocony is present as fissure and cavity fillings. This ore was reported to yield about \$30 per ton in gold (Mining and Scientific Press, vol. 70, p. 106).

Development: At present all former workings are caved or partially filled. As previously stated, the development consisted of a shaft some 85 feet deep and shallow surface work.

Production: Undetermined.

References: Mining and Scientific Press, 1894, vol. 69, p. 394; 1895, vol. 70, p. 106; Crawford, 1894, p. 221; 1896, p. 310; Merrill and Waring, 1917, p. 534; Tucker and Sampson, 1929, p. 472; 1945, p. 127, pl. 35; Sampson, 1935, p. 508.

R.B.S. 10/19/59.

Anna Bell Mine

Location: Sec. 24 (proj.), T. 4 S., R. 22 E., S.B.M., Big Maria Mountains quadrangle, 1951; on the southwest side of a northwest-trending canyon in the Big Maria Mountains. The mine is about 25 miles, by road, north of Blythe. The last 7 miles is an unimproved dirt road and jeep trail which extends westward from U. S. 95.

Ownership: Undetermined (1958).

History: Undetermined.

Geology: Two shear zones are exposed in a steep ravine. The lower shear strikes N. 35° W., is vertical, is as much as 10 feet wide, and exposed for about 100 feet along its strike. The upper shear zone is about 100 feet slope distance farther up the ravine. It strikes roughly east, dips 25° - 30° S., is as much as 12 feet wide, and exposed for about 60 feet on the surface. The country rock is gneiss, gneissic granite, and carbonate rocks which have been altered in part to calc-silicate minerals. A general attitude, taken near the upper shear zone, is N. 55° W., 55° SW. The heaviest concentration of ore and associated gangue minerals occurs in a shoot at the junction of the upper shear zone and a limestone unit. The ore minerals are pyrite and iron oxides. Both shear zones contain small amounts of secondary copper minerals which probably are alteration products of chalcopyrite.

ANAHEIM MINE

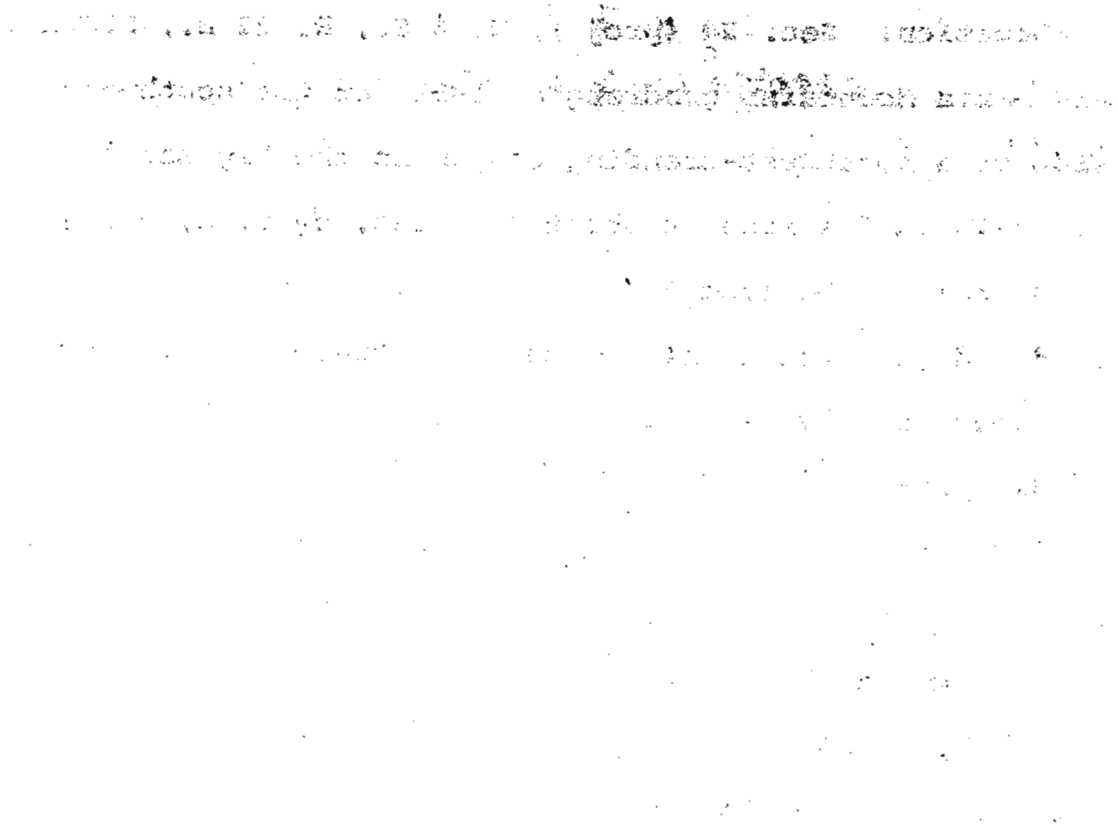


Fig. 1/. Sketch map showing the workings of the Anaheim mine and their areal distribution (topography from U.S.G.S. 15' Valley Mountain quadrangle, 1956).

Anaheim Mine

Location: SW $\frac{1}{4}$ sec. 6, T. 2 S., R. 10 E., S.B.M.
(proj.), (~~U. S. Geological Survey~~^{out}) Valley Mountain quad-
rangle, 1956; Pinto Mountains, Gold Park, 9 miles S.
30° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: The mine was active in 1929 and 2 men were
employed. It was idle in 1945 but still owned by Edward
Harman, Garden Grove (Tucker and Sampson, 1929, p. 472
and 1945, p. 128).

Geology: Gold Park gabbro-diorite, and hornblende
granite intrude the Pinto gneiss. These rocks are cut
by several steeply dipping faults. Pegmatite dikes,
fine-grained green basic dikes, aplite dikes, and gold
(?) -quartz veins have all been exposed, and are strongest
in, and adjacent to fault zones (fig. 1/).

Development: A short adit, and several shafts, 2 at
least 100 feet in depth, have been sunk in steeply dipping
fault planes. Shallow prospects dot the landscape in the
vicinity of the major workings (fig. 1/). The mine is
idle.

Production: Undetermined, April 1959.

References: Tucker and Sampson, 1929, p. 472; Tucker
and Sampson, 1945, p. 128.

J.R.E. 4/13/59.

American Flag Mine

See Hidden Treasure Claims.

↑
O.K.

Atlanta (Ronnie B.) Mine

Location: NE $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, 8.3 miles S. 28° E. from Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Carlos J. Bassler, Jr., and Francis E. Bassler, 2112 Cedar St., Alhambra, own one unpatented claim (February 1959).

History: The mine was originally located as the Atlanta and in 1920 was owned by the Gold Park Consolidated Mining Company, W. C. Winnie, president, J. E. Schweng, secretary, C. W. Roach, manager; Offices 1021 Black Building, Los Angeles (Tucker, 1921, p. 347). At this time the Atlanta claims included the present site and what workings as there were, of the North Star gold mine. J. Klugh of Pasadena owned the mine in 1929. It was located as the North Star group (Tucker and Sampson, 1929, p. 472). In 1945 the property was owned by the Floyd Mining and Milling Company, Earl F. Skadan, president, G. C. Zimmerman, secretary, Norco, and was known as the North Star group of mines (Tucker and Sampson, 1945, p. 140). Since 1956 the workings in the extreme northwest corner of sec. 6, T. 2 S., R. 10 E., (proj.) have been called the North Star mine, and the shaft and prospects just east of the Gold Park road on a small knoll (NE $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., (proj.) have been called the Atlanta (Ronnie B. mine (pl. 1/).

Geology: Milky quartz veins, as much as 2 feet thick, occur along a N. 20° W.-trending and 75°-80° W.-dipping fault in thoroughly weathered, hornblende granite. The quartz contains pyrite and gold (?) and is highly discolored by brownish-red iron stains. The area in the immediate vicinity of the mine is much intruded by thin pegmatite and fine-grained green basic dikes.

Development: A nearly vertical 2 compartment shaft, well timbered and in good condition, has been sunk at least 75 feet in the fault zone. Several shallow pits and trenches have been dug along the fault over a distance of about 1,500 feet. The mine is idle.

Production: Undetermined.

References: Tucker, 1921, p. 347; Tucker and Sampson, 1929, p. 472; Tucker and Sampson, 1945, p. 140.

J.R.E. 2/10/59.

Arlington Tunnel

Location: Sec. 13 (proj.) T. 4 S., R. 5 W., S.B.M.,
Steel Peak quadrangle, 7½', 1953; about one mile south
of Cajalco fire station.

Ownership: H. D. Goetze, Route 1, Box 81, Perris.

History: In the late 1800's the area to the south of
this development, known as Gavilan Flat, was held by
San Jacinto Estate, Limited, an English firm. It was
planned to develop the various gold claims ^{on Gavilan Flat} systematically
and to drain the entire group through a common adit.

"There will be three main shafts sunk, called
the Washington, the Gavilan and the Hoag, (see herein)
and an adit level will drain all of them." (Mining and
Scientific Press, 1891, vol. 63, p. 132).

It is generally agreed, by older residents in
the area, that this, the Arlington Tunnel, was to be that
proposed "adit level". Apparently it was never finished.
To have done so would have required an adit length of
nearly 2 miles.

Geology: The country rock is sheared and jointed
diorite. No well defined vein is exposed at or near the
portal.

See
p. 247

Development: A single adit was driven S. 25° W. for an undetermined distance. The large dump suggests that local reports of a length as great as 2,000 feet might be correct. At present (1959) the adit is sealed about 100 feet from the portal and serves as a source of water for an adjoining ranch.

References: Mining and Scientific Press, 1891, vol. 63, no. 9, p. 132.
R.B.S. 6/16/59.

Arica Mine

See: Lum Gray Mine.

Development: The lower shear zone is explored by a single vertical shaft about 30 feet deep which is untimbered. The ore shoot in the upper shear zone is explored by an adit driven west about 30 feet. A winze about 12 feet deep is 15 feet from the portal. The adit and winze are open, dry, and untimbered.

Production: Undetermined.

References: None.

R.B.S. 12/16/58.

Augustine Mine

Location: S $\frac{1}{2}$ sec. 8 (proj.), N $\frac{1}{2}$ sec. 17 (proj.),
T. 8 S., R. 17 E., S.B.M., Chuckwalla Spring quadrangle,
1953; just west of Augustine Road and 1 $\frac{1}{2}$ miles north-
west of Chuckwalla Spring. The property is reached by
Augustine Road, an unimproved dirt road, shown in part
as a trail on the map, which extends west and southwest
from the road to Chuckwalla Spring.

Ownership: Undetermined: Mr. George C. Mieding, 8815
Klindale, Pico Rivera, is considering (April, 1961) develop-
ing this mine in association with a number of other indi-
viduals.

History: Undetermined.

Geology: The Augustine Mine as here described includes
a group of developments on an undetermined number of un-
patented claims lying on the southeast and east slopes of
a ridge of gneissic rocks (fig. ___/).

The deposits are controlled by faults and
shearing in the gneiss. They differ in their mineralogic
makeup and are probably of different ages.

The most northeasterly deposit (fig. ___/) lies
along a poorly exposed vertical fault striking N. 65° -
80° E. across the southeast slope of a low ridge. A quartz
vein as much as 6 inches wide carries local concentrations
of galena across its full width. The galena contains
lesser proportions of pyrite and is altered in part to
cerussite. It probably carries silver.

The southwest deposit comprises 2 quartz veins, a lower one in shear plains of the gneissic country rock, an upper vein in the plane of a normal fault which cuts and displaces the gneissic structure. The former is exposed on the southeast slope of the ridge where it strikes N. 15° E. and dips 30° NW. The latter strikes N. 85° E. in an oblique angle across the ridge just northeast of the peak (altitude 2555 feet as shown on the topographic map) and dips 70° north-northwest (fig. ___/).

The lower vein consists of discontinuous, lenticular bodies of quartz ranging from 0 to 2 feet in thickness, in a zone of differential movement between layers of the gneissic country rock. The upper vein has been crushed and attenuated by continued movement on the containing fault plane. The vein matter forms lenticular bodies ranging from 0 to 4 inches in thickness.

These southwest veins are of similar mineral content but the upper deposit appears to be the richest. They carry oxides of iron, secondary copper minerals, pyrite, chalcopyrite, and gold.

The lower vein might yield a small quantity of silver from scattered, small bunches of galena. Galena was not identified in the upper vein but may have been altered owing to the shattered condition of the rock.

Development: The northeast vein is explored by a 12-foot shaft from which a 20-foot drift extends southwest about 300 feet to the southwest ^{of the 12-foot shaft there is} an inclined shaft at least 80 feet deep near which is a 30-foot vertical shaft.

The southwest veins are explored as follows. The lower vein was opened by an inclined shaft about 75 feet deep and is exposed in shallow prospects along its outcrop northeast and southwest of the shaft through a distance of roughly 1000 feet. The upper vein was opened by 2 short, adits several hundred feet apart, one driven 10 feet southwest from high on the southeast slope of the ridge and the other 12 feet northeast from the northwest slope.

Production: Undetermined.

References: None.

R.B.S. 1/20/60.

Inchinda
M.B.

Aztec and Rainbow Claims

Location: Sec. 19 (proj.), T. 7 S., R. 17 E., S.B.M., Sidewinder Well quadrangle, 1952. Eight miles of unimproved road, named Dupont Road on the topographic map, extends southwest to the mine from merged U. S. Highways 60 and 70 at a point 17 miles east of Desert Center.

Ownership: J. Dupont, Desert Center (1959).

History: Mining was started on this property in 1936 and has continued, on a small scale to the present.

Geology: Several poorly exposed quartz veins, as wide as 4 inches, lie along west-trending vertical faults which cut a low ridge of gneiss. The veins are offset along a barren, fault zone which strikes N. 35° W., along the crest of the ridge and dips about 80° NE.

Minerals associated with the quartz veins are: oxides of iron, pyrite, galena, chrysocolla, cerussite, and wulfenite. Free-milling gold is unevenly distributed through the veins.

Development: The most recent development comprises several shallow prospects and trenches on the crest of the ridge. The older workings consist of an adit and open trenches. The adit portal is low on the west slope of the ridge. It was driven 90 feet east on a fault zone ^{as much as} ~~up to~~ 4 feet wide. The trenches are at the base of the slope ~~and~~ about 300 feet south of the adit and were the site of the earliest work on the claims.

Production: In 1936, 4 to 5 tons of high-grade ore was shipped to U. S. Smelting and Refining Co. at Midvale, ^{le} Utah. This ore was taken from veins exposed in the old trench workings. It yielded \$400 in gold (J. Dupont, personal communication).

References: None.

R.B.S. 4/28/59.

Barrel Tanks Placer

Location: Sec. 15?, T. 2 S., R. 13 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15' 1943; along the north slope of the Eagle Mountains, in the vicinity of, and may be the same as, the Mystery Mine (see herein), about 6 miles southeast of Mission Well.

Not confirmed, May 1961.

Ownership: Ivan C. Winter and Ray Severence, Box 1271, Twentynine Palms, 1961.

History: William S. Wayne operated and prospected this property on a small scale from 1936 to 1960.

Geology: Placer gold in alluvium.

Development: Undetermined. Reported to be a small-scale hand-operated dry washing operation (personal communication W. S. Wayne, 1958).

Production: Compiled by the U. S. Bureau of Mines.

Year	Yardage Handled	Gold ounces
1936	150	15.19
1938	157	5.00
1939	32	2.00
1940	68	4.00
1942	66	4.00

References: None.

C.H.G. 5/16/61.

Baumonk

See Crescent (Baumonk).

Beal Mine

Location: Sec. 19 (?), T. 7 S., R. 16 E., S.B.M., U.S. Corps of Army Engineers Chuckwalla Mountains quadrangle, 15', 1945; on the south slope of the Chuckwalla Mountains, one mile west of Black Butte and 2 miles north of Gulliday Well.

Ownership: Undetermined.

History: Undetermined.

Geology: The Beal Mine workings explore a shear zone ranging from 15 to 50 feet in width between granite and gneiss. The shear zone strikes N. 15°- 20° E. and its dip ranges from vertical to 60° NW. A fractured and altered basic dike lies in the zone and pods and stringers of crushed, finely crystalline quartz, ranging from 0 to 2 feet in thickness, are contained in a soft micaceous gouge. The quartz is seamed and pocketed with iron oxides containing traces of free gold.

Although the contact zone appears to be exposed for several miles, the Beal mine explores an outcrop only about 300 feet long in a shallow south-trending ravine (fig. __/).

Development: The shear zone was explored by means of 2 adits and several prospects. The Upper adit is about 45 feet long and appears to have been driven along irregular shear planes within the larger zone. The lower adit is caved at the portal, but the small amount of dump material suggests that it is not extensive.

Production: Undetermined. ~~Idle, (1960).~~

References: None.

R.B.S. 2/9/60.

Bill Rush Claims

Location: Center sec. 19, T. 2 S., R. 10 E., S.B.M., (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; southwestern part of the Pinto Mountains, Joshua Tree National Monument, 2½ miles east of White Tank Campground.

Ownership: Undetermined.

History: Undetermined. Apparently long idle.

Geology: Altered felsite dike 20 feet wide trends N. 30° W., in Pinto gneiss. The dike shows sparse maroon to yellow-brown iron oxide stain and contains a few pyrite cubes altered to iron oxide. The workings explore a vertical shear in the dike containing very white, smooth, clay gouge material.

Development: Adit driven S. 30° E. on the dike, size of dump suggests at least 100 feet of workings. Several shallow prospect pits and short adits explore the dike over a distance of several hundred feet to the southeast.

Production: Undetermined.

References: None.

C.H.G. 5/16/61.

Blackbird Mine

See Tubbs Claims (tungsten-gold).

Black Butte (Gold Tiger) Mine

Location: NE $\frac{1}{4}$ sec. 10, T. 2 S., R. 8 E., S.B.M.,
Twentynine Palms quadrangle, 1955; Joshua Tree National
Monument, 1 mile north of Sheep Pass in low hills
between Lost Horse and Queen Valleys.

Ownership: Dr. H. W. Milo, 224 El Camino Real, Vallejo
owns 1 lode claim, the Black Butte (1960).

History: No record of this property was found, but
the workings are old and may date from the 1890's. It
was formerly held by W. F. Keys and known as the Gold
Tiger, but apparently Mr. Keys never operated the mine.

Geology: A sheared, altered, mafic dike in gneiss
(Pinto gneiss) strikes N. 68° E., is vertical, ranges
from 1 to 3 feet in thickness, and is discontinuously
exposed at the surface for at least 1,100 feet. The
sheared zone contains thin quartz veins and where best
exposed in an open-cut in the southwest part of the
claim the quartz vein is 2 to 4 inches thick at the
northwest margin of the shear.

Development: The mafic dike has been explored along its entire length by almost continuous shallow open-cuts and shafts, and drift adits, now largely caved. The principal workings apparently were the "Gold Tiger Tunnel" toward the east end of the outcrop, and the "Ironclad Shaft" in the central part. The extent of these workings was not determined.

Production: Undetermined.

References: None.

C.H.G. 1/27/60.

Black Canyon Group

See Steece Group.

Black Jack Claims

See Dos Palmas Mine.

Black Warrior (Gold Master?, Paymaster?) Mine

Location: Center of NW $\frac{1}{4}$ sec. 20, T. 2 S., R. 10 E.,

S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham
Well quadrangle, 15', 1943 (previously reported in
sec. 16, T. 2 S., R. 9 E., S.B.M., Tucker and Sampson,
1929, p. 476); southwestern part of the Pinto Mountains,
in Joshua Tree National Monument, $3\frac{1}{4}$ miles east of White
Tank Campground.

Ownership: William F. Keys, Joshua Tree (1929),
undetermined (1961).

Bonanza Lode

Location: NE $\frac{1}{4}$ sec. 26(?), T.3 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree National
Monument, 1 mile southwest of Pinyon Well, north slope
of the Little San Bernardino Mountains. This location
is from patent plats and Tucker and Sampson (1945, pl. 35,
No. 24), but no trace of mining activity was found at this
location in 1960. This may be an erroneous location
and the property could be in the NW $\frac{1}{4}$ sec. 26.

Ownership: In 1923 the New Eldorado Mining Company
held one patented claim (Bonanza) of 20.54 acres. Undeter-
mined (1960).

History: According to patent records the Bonanza claim
was first located in 1905, amended in 1921, surveyed for
patent in 1921, and the patent issued in 1923. At time
of patent the map shows: road to the property, cabin,
well, and 10-foot discovery shaft. Survey no. 5600,
Patent No. 911384.

Geology: The NE $\frac{1}{4}$ sec. 26 is entirely underlain by
coarse-grained quartz monzonite (White Tank quartz
monzonite). In the NW $\frac{1}{4}$ sec. 26 the quartz monzonite
contains quartz veins which strike northwest and dip
steeply southwest.

History: The Black Warrior was discovered before 1900, and is said to have been located by Bill McHaney (W. F. Keys oral communication, 1960). By 1918 it was one of, and the most southerly of, a group of 52 claims owned by the Gold Park Consolidated Mines Company. At this time the workings consisted of a 200-foot shaft with 150 feet of drifts and crosscuts; two men were employed in development work; ore was hauled to Twenty-nine Palms, but by 1918 very little ore had been treated; and the workings were filled with water below the 70-foot level (surface water which seeped in through an old shaft in the adjacent canyon bottom). Also in 1918 the dump was said to contain 2,200 tons of ore that assayed \$14.00 per ton (Tucker, 1921, p. 348). In 1929 William F. Keys was listed as owner, the workings were described the same as in 1918, and the mine was idle (Tucker and Sampson, 1929, p. 476). Apparently Mr. Keys held 3 claims known as Paymaster South Extension, and Paymaster North Extension. During the 1930's the property was leased and much of the dump material was hauled away by truck and milled. The property has since been idle and was renamed the Gold Master in recent years (oral communication, W. F. Keys, 1960).

Geology: Irregular shear zone in banded diorite gneiss (Pinto gneiss).. At the surface at the west edge of the shaft the shear zone is about 8 feet wide with 5 feet of red-brown iron oxide stained sheared country rock and a 3-foot wide crushed quartz zone with considerable iron gossan. The quartz-filled shear zone appears to be very irregular, it strikes N. 50° W. and is vertical at the shaft, but in the adit below strikes about N. 10° W. Tucker (1921, p. 348) described the mine as follows:

"Mineralization occurs along a shear zone in altered granite. The hanging is a gneiss with a well defined talc wall. General trend of the ore body is N. 10° W. with a dip to the west---The quartz in the vein matter is highly oxidized and contains considerable iron and lime. Its black appearance, due to iron and manganese stains, gives it its name. The vein is different from others of the district, containing considerable pyrite and some arsenopyrite."

Development: Vertical shaft, may be joined to a drift adit, 50 feet south and 35 feet below the shaft, and driven north from the edge of a narrow canyon. The adit has been extensively stoped. According to Tucker (1921, p. 348) "The shaft is vertical to 70-foot level, from this point sunk on an incline of 65° east. On 70-foot level a drift runs 100 feet N. 45° W., exposing an ore body 60 feet in width. Mineralized zone made up of quartz and brecciated wall rock. On 150 foot level a crosscut was run 60 feet west, and is said to be entirely in ore." In 1929 Tucker and Sampson (p. 476) reported the shaft to be 200 feet deep. The adit is not mentioned in the old reports and may be work done subsequently in the 1930's.

Production: U. S. Bureau of Mines records credit the following production to a Paymaster Mine located in sec. 15, T. 3 S., R. 10 E., S.B.M., and operated by W. N. Thompson, Box 397, La Habra. This may be the same as the Black Warrior Mine for which no record of production was found inasmuch as the years listed are about the time the Black Warrior is said to have last been active and no mine is known for sec. 15.

Year	Crude Ore (tons)	Recoverable Metals	
		Gold (ounces)	Silver (ounces)
1935	160	22.9	1
1936	240	55.66	16
1940	46	30.00	3

References: Tucker, 1921, p. 348; Tucker and Sampson 1929, p. 426; Tucker and Sampson, 1945, p. 128.
C.H.G. 5/16/61.

Black Warrior (Paymaster) Mine

Location: Sec. 15, 16, 17, 20, 21 (?), T. 2 S.,

R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers,
Pinkham Well quadrangle, 15', 1943; Pinto Mountains,
about 12 miles southeast of Twentynine Palms. This
deposit was not found in the field but the location
given above is very close (William F. Keys, oral communi-
cation, January 1960). Mr. Keys also indicated that the
Black Warrior and Paymaster are two different names for
the same mine.

Ownership: Undetermined.

History: In 1921 the mine was owned by Gold Park
Consolidated Mines Company (Tucker, 1921, p. 348). From
1929 to at least 1945 the mine was owned by William F.
Keys formerly of Banning, and Twentynine Palms; present
address is P.O. Box 114, Joshua Tree (Tucker and Sampson,
1929, p. 476, and 1945, p. 128).

Geology: Highly oxidized vein quartz containing iron
and manganese oxides and considerable pyrite and some
arsenopyrite occurs along a generally north-trending shear
zone in gneissoid-granite (Tucker and Sampson, 1929, p. 476).

Development: A shaft 200 feet deep is vertical to the 70-foot level from where it is sunk 65° east; at the 70-foot level there is a drift run 90 feet north-west and on the 150-foot level a crosscut was run 60 feet west (Tucker and Sampson, 1929, p. 476).

Production: Undetermined.

References: Tucker, 1921, p. 348; Tucker and Sampson, 1929, p. 476; Tucker and Sampson 1945, p. 128, 141.

Development: No mine workings were observed in the NE $\frac{1}{4}$ sec. 26. In the NW $\frac{1}{4}$ sec. 26, however, quartz veins have been explored by pits and shafts (See Hansen Mine herein).

Production: Undetermined.

References: Tucker and Sampson, 1945, pl. 35, No. 24.
C.H.G. 1/26/60.

Boss (Goat or Gcat Basin) Mine

Location: NE $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, 8.1 miles S. 27° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: In 1921 the mine was owned by the Gold Park Consolidated Mines Company, W. C. Winnie, president, V. E. Schweng, secretary, C. W. Roach, manager; Offices 1021 Black Building, Los Angeles, ^{and consisted of a 122-foot} shaft with about 1,000 feet of crosscuts and drifts at ^{that level;} ~~this level~~; including a 200-foot north drift (Tucker, 1921, p. 347). In 1929 the mine was idle, all equipment had been removed and apparently no work was done in the interval of time between 1921 and 1929 (Tucker and Sampson, 1929, p. 476). W. F. Keyes, Banning (present address - P.O. Box 114, Joshua Tree) was the owner.

Geology: Tan colored quartz monzonite and hornblende granite intrude the Pinto gneiss. Locally, segments of gneiss have been engulfed and occur as xenoliths and perhaps roof pendants. The mine area is much faulted and aplite dikes, green basic dikes, and thin veins of gold (?) bearing quartz, transecting all other rock units, are strongest in these ^{fault} zones (fig. 1/).

Development: The main workings consist of the previously mentioned 122-foot shaft with the associated drifts and crosscuts. Four other shafts of varying depth, have been sunk adjacent to and about 1,000 feet west of the main workings (fig. 1/). About 30 feet above the main shaft an adit is driven 40 feet south along the plane of a west-dipping fault (fig. 1/). The mine is idle.

Production: Undetermined.

References: Tucker, 1921, p. 347; Tucker and Sampson, 1929, p. 476.

J.R.E. 2/10/59.

Figure 1/. Sketch map showing the areal distribution of workings (A); and a geologic sketch map (B) of the Boss (Goat or Goat Basin) mine (topography from U.S.G.S. 15' Valley Mountain quadrangle, 1956).

Blue Bell Mine

See Golden Bell Mine.

Brooklyn, Los Angeles, and Gold Rose Mines

Location: Sec. 1, T. 2 S., R. 12 E., and sec. 36, T. 1 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about 2½ miles southeast of New Dale (Site) and about 5 miles north of Mission and Sunrise Wells. The Brooklyn mine is probably in San Bernardino County (see pl. 3/). The Brooklyn-Los Angeles mines have been previously included in reports on San Bernardino County.

Ownership: The Brooklyn and Los Angeles mines are owned by the Brooklyn Mining Co., c/o Clifford Coy, 2032 Genevieve St., San Bernardino (March 1958). The Gold Rose mine is owned by Bonnie H. and Dean H. Oehl, 777 E. 9th Ave., San Bernardino (March 1958).

History: A gold-bearing quartz vein was discovered in 1893 by Ames and Walter Yager on the present site of the Brooklyn mine. They worked the vein intermittently until 1901. From 1902 to 1916 the mine was developed by the Brooklyn Mining Co., San Bernardino, and known as the Brooklyn mine. The mine apparently was not again in operation until the 1930's when together with the Los Angeles and Gold Rose (?) mines it was consolidated under one ownership and operated by the Brooklyn Mining Company. The mines were shut down in 1941. Previous to 1930 water was secured at the Supply mine in San Bernardino County, and hauled southeast over the mountains on 5 miles of dirt roads and trails. Because the water problem apparently outweighed the convenience of milling the ore in the area, a new mill was built at Gold Rose Well. This mill, built in the late 1930's, is about 5 miles south of the Brooklyn mine and 1 mile east of Mission and Sunrise Wells. (P.L. 31).

Geology: The country rock is quartz monzonite cut by diorite dikes and ⁵five parallel quartz veins, about 1000 feet apart. Two gold-bearing quartz veins, one known as the Brooklyn, the other the Los Angeles, have been the most extensively developed. They strike northwest, dip 70° NE., range in thickness from 2 to 6 feet, and are locally stained with secondary iron and copper minerals.

Development: The Brooklyn vein is proven 1500 feet on the surface and is developed by a drift adit driven 550 feet northwest in the vein about 100 feet below its outcrop. About 300 feet from the portal, a winze has been sunk on the vein to a depth of 200 feet. Level workings extending from the winze at 60 (?), 110, 160, and 200 feet below the adit level have developed two ore shoots; one was 175 feet long, the other 260 feet long, and both had an average width of 4 feet. The shoots had a reported value of \$15 a ton. In the early 1930's there was a 3 (750-pounds stamps) stamp mill and a 30-ton rod mill on the property.

The main shaft at the Los Angeles mine is sunk 750 feet on the vein. About 540 feet northwest of the main shaft another shaft is sunk 250 feet in the vein. A drift on the 120-foot level connects these two shafts. Level workings extend from the main shaft at 52, 120, 320, 420, and 685 feet below the surface, and have developed two ore shoots; one was 275 feet long, the other 300 feet long, both had an average width of 5 feet. The shoots had a reported value of \$12 per ton. In the early 1930's there was a 3 (250-pound stamp) stamp mill on the property.

The workings at the Gold Rose mine are of much less extent and consist mainly of 5 nearly vertical shafts with depths ranging from 25 to at least 250 feet. One or both of the veins explored contained copper carbonate and bunches of galena. The clots of galena occurred sporadically along the vein and contained values in both gold and silver (Tucker and Sampson, 1930, p. 238). The mine is now being worked intermittently by Dean Oehl (Karl Schapel oral communication, 3/8/60).

Production: The Brooklyn, Los Angeles and Gold Rose Mines were mined sporadically from 1900 to 1941. About 10,000 tons of ore ^{was} (were) removed, from which nearly 5,000 ounces of gold, 4,500 ounces of silver, 3,000 pounds of copper, and 260 pounds of lead were recovered.

References: Cloudman, Huguenin, and Merrill, 1919,
p. 802; Eric, 1948, p. 291, 300; Newman, 1923, pp. 221-222;
Tucker and Sampson, 1930, pp. 227-229 and p. 238; Tucker,
1930, unpublished Field Report No. 331; Tucker and Sampson,
1931, pp. 289-290; Tucker and Sampson, 1934, p. 321.

J.R.E. 3/8/60

Brown (Hillside Group) Mine

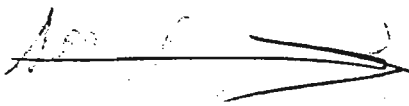
Location: NW $\frac{1}{4}$ and SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 7 (proj.), T. 2 S., R. 20 E., S.B.M., Rice quadrangle, 1954; east slope of the Arica Mountains, 6 $\frac{1}{2}$ miles southwest of Rice.

Ownership: Undetermined (1958).

History: In the early 1900's the Brown Claims comprised two separate groups, a north group of claims held by Mrs. Floyd Brown (see herein under Brown Mine North) and this, the southern group, which included the main camp and 3-stamp mill, under the ownership of Mr. Floyd Brown, a resident of Blythe (Merrill and Waring, 1917, p. 542). The Brown Claims appear to have been most active during the twenties. They were reported idle in 1929 (Tucker and Sampson, p. 476) and in 1945, by which time they had been relocated as the Hillside Group by T. H. Mulhall, Tecopa (Tucker and Sampson, 1945, p. 128).

Geology: The Brown Mine explores gold-bearing quartz veins in two shear zones which cut hornfelsic and gneissic metasediments which underlie ^{the} southeast slope of the Arica Mountains. The rocks strike about N. 50° W. and dip 45° SW. The shears appear to be an echelon. One, striking N. 5° W. and dipping 60° W., is exposed for several hundred feet at the north end of the property, the other strikes N. 50° W., dips 70° SW. and crops out irregularly for roughly half a mile at the south end of the property.

Development: The north shear zone is explored by a single drift adit about 40 feet long from which two short stopes extend to the surface and below which a winze extends to a depth of 12 feet. Though these workings appear to explore an ore shoot, the vein is little more than a foot wide at the portal. Papers found near ^{this development} ~~these workings~~ indicate that it was located (or relocated) by T. H. Mulhall, in 1944, as the Dewey No. 5. Presumably, it was part of the old Brown group.



Development of the south vein consists of a vertical shaft of uncertain depth, a 100⁺ foot shaft inclined 60° southwestward on the vein, a short adit, and extreme southern workings marked as an adit on the topographic map but not visited.

The inclined shaft, situated about 100 feet up the slope west of the old camp site, and the vertical shaft about 300 feet to the northwest, appear to have been the principal sites of activity on these claims. A contorted and fractured quartz vein as much as one foot thick is exposed in the portals of these shafts. An old tripod head frame still stands at the collar of the inclined shaft and light timbering is intact within it (1958). The extent of the underground workings was not determined. The short adit was driven in the south side of a shallow canyon just south of the old camp site. It is about 30 feet ^{long} deep and appears to be little more than a prospect.

*See P. 370
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Brown Mine North

Location: NW¹/₄NE¹/₄ sec. 1, T. 2 S., R. 19 E., S.B.M., Rice quadrangle, 1954; east slope and at the north end of the Arica Mountains, 6 miles southwest of Rice.

Ownership: Undetermined.

History: The name of this mine is inferred from an early report (Merrill and Waring, 1917, p. 542) which referred to "Mrs. Floyd Brown's mine--located north of the Gray Mine." (See herein under Brown Mine).

Geology: A gold-bearing quartz vein lies in a shear zone in gneissic metasedimentary rocks. The shear zone strikes approximately north and dips about 50° W. It is traceable for about 500 feet along the strike, but talus obscures the exposures.

The quartz vein ranges from 1 to 18 inches in thickness. It is fractured and sparsely mineralized with iron and manganese oxides, and chrysocolla.



Development: The claims have been developed through an adit (shown on the topographic map), a 10-foot, vertical shaft, and several shallow prospects.

The adit is driven about 25 feet southeast, on a vertical quartz vein as much as 2 feet wide, exposed on the slope of the ridge. This opening is part of an earlier period of development. The 10-foot shaft is new work and explores the alluvium near the base of the slope at a point about 1,000 feet south of the adit. The presence of a discovery in the shaft could not be determined from the collar.

Production: Undetermined.

References: None.

R.B.S. 10/17/60.



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Production: Statistics were not found for these claims, but the vein material resembles that of the nearby Lum Gran and Mountain Queen mines.

References: Merrill and Waring, 1919, p. 82; Tucker and Sampson, 1929, p. 476-477; 1945, p. 128-129, pl. 35.
R.B.S. 4/11/58.

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Development: The vein was explored by 4 inclined shafts. An adit was driven west in the side of a steep ravine for a distance of about 40 feet. It is at the end of the road and may have been used for storage as there is no clearly defined vein where it enters the slope. The 4 inclined shafts are about 200 vertical feet up the slope to the west of the adit. The southernmost shaft is inclined 45° SW. and is 12 feet deep. Immediately north the other 3 shafts are spaced unevenly along the shear through a distance of about 300 feet. The strike of the shear swings to the east so that the southern two shafts bear due west and the somewhat isolated northernmost shaft bears northwest. All three are inclined from 50° to 60°, coincident with the shear zone. From south to north these shafts are respectively 60, 12 and 60 feet deep. Though a small amount of drifting and stoping appears to have been done the exact extent was not determined. The ore was transported from the site of the shafts to a loading point lower on the slope by means of a tramway about 400 yards long.

Production: Undetermined (1958).

References: Merrill and Waring, 1917, p. 542;

Tucker, 1929, p. 476-477; Tucker and Sampson, 1945, p.128, pl. 35.

R.B.S. 4/11/58.

Bryan mine

Location: Sec. 32, T. 6 S., R. 16 E., (proj.), S.B.M., Chuckwalla Mountains quadrangle, 15', 1945; 7½ miles south-east of Desert Center and 1½ miles southwest of Corn Spring.

Ownership: Undetermined (1959). This claim was patented by James M. Huston, in 1915 (U.S. Bureau of Land Management records). In 1945 J. M. Huston of Los Angeles, presumably the same man, was reported to be the owner (Tucker and Sampson, p. 129).

History: The Bryan mine was operated from 1898 to 1900 by Adams and Pickering. The ore was processed in a two-stamp mill at Corn Springs (Merrill and Waring, 1919, p. 539). The property was described in 1945 (Tucker and Sampson, p. 129). In that report two claims, the Bryan and Dottie Wellborne, were included under the name Bryan. The Dottie Wellborne (see herein) is not near the Bryan. It is in the next township to the west, is tied to U.S. Location Monument no. 80 instead of U.S. Mineral Monument no. 146 as is the Bryan, and was part of the Red Cloud Mining Company holdings (Saul, 1962, p. 3,7).

Geology: Several en echelon shear zones and associated quartz veins are exposed for about 1800 feet down a ridge. They strike north to N. 30° E. and dip 50° W. and NW. The veins range from fine stringers a fraction of an inch wide to as much as 3 feet in width.

Cactus Group of Mines (?)

Location: Secs. 22, 27, T. 3 S., R. 13 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; northwestern part of the Eagle Mountains, 6 1/2 miles southeast of Mission Well, astride Cactus Gulch.

Ownership: Undetermined.

History: The Cactus group was located prior to 1900. The property was surveyed for patent in 1900 (Survey No. 3830) and 3 claims (Cactus, Hustler, Short Horn) totaling 31.06 acres were patented in 1903 to The Eagle Mountain Gold Mining Company. Remains of a camp site suggest the property was active during the 1930's. Idle.

Geology: Shear zone in metasedimentary rocks intruded by quartz monzonite. The shear zone strikes N. 10° W., is about 10 feet wide, and contains a vertical brecciated quartz vein. The sheared rock is stained red brown by iron oxide.

Figure 1/. Sketch map showing the location and distribution of the workings of the Carlos Jr. gold mine (topography from U.S.G.S. 15' Valley Mountain quadrangle, 1956).

The country rock is porphyritic granite, lenticular bodies of dioritic-to gabbroic composition and fine-grained basic dikes.

The quartz veins are heavily stained and pocketed with iron oxides. There are smaller proportions of pyrite and stains and thin crusts of copper minerals.

Development: The property was developed at three levels spaced at roughly equal intervals up the ridge.

The lower level is a 30-foot adit driven S. 30° W. on a vein as much as 2 feet wide.

The middle level consists of an adit driven S. 30° W., 280 feet through sheared and jointed granite. About 130 feet from the portal a short drift extends 35 feet to the right and a 45-foot drift was driven left from the end of the adit. This level appears to have been exploratory; it cuts no veins.

The workings at the upper level were unsafe and were not thoroughly explored. They appear to consist of an inclined shaft about 40 feet deep from which a drift extends southeast along the vein. The vein is stoped to the surface for 50 feet southwest of the shaft. Ore was moved from the upper workings to the canyon below by means of a cable tramway.

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Production: No production data were found for this mine. The ore was reported to have milled \$7 per ton (Tucker and Sampson, 1945, p. 129). Most of the mining probably was done between 1898 and 1900.

References: Merrill and Waring, 1919, p. 539; Tucker and Sampson, 1929, p. 477, 1945, p. 129; Saul, 1962, p. 7.

R.B.S. 3/13/59

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Development: The shear zone is explored by a drift adit of undetermined length driven N. 10° W. About 500 feet to the northwest of the portal is a crosscut adit. About 3/4 mile to the south a 75-foot vertical shaft explores a copper-stained shear zone in quartz monzonite.

Production: Undetermined.

References: (None.) Saul, 1967, p. 7

C.H.G. 5/16/61.

Calidonia Mine

See Pinto Mine.

Captain Jinks (Jenks) Mine

Location: Sec. 1 (?), T. 4 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; southeastern Hexie Mountains, Joshua Tree National Monument, in rugged hills north of upper Porcupine Wash.

Ownership: Undetermined.

History: This property is said to have been discovered and worked by a Captain Jinks or Jenks in 1874. About 1900 it was held by C. A. Pinkham. In 1951 it was relocated as the Phyllis Silver by W. F., Frances M., and Phyllis Ann Keys (personal communication, W. F. Keys). Apparently the property has been long idle.

Geology: The mine area is underlain by an igneous-metamorphic complex (Chuckwalla Complex?) including hornfels, quartzite, biotite schist, quartz biotite gneiss, and diorite. Two nearly parallel quartz veins, about 300 feet apart, have been explored. The east vein strikes N. 15°-20° W., dips 60° NE., is 1 to 2 feet wide at the main shaft and crops out intermittently southeasterly from the shaft at least 1,500 feet. The footwall is quartzite and biotite schist and the hanging wall is a weathered diorite dike and quartz biotite gneiss. The west vein crops out in a shear zone which can be traced for several thousand feet along the east side of a ridge. The vein strikes N. 25° W., dips 60° NE., is 1 to 2 feet wide, and is black to red brown and yellow brown iron-stained quartz with sparse green and blue green copper coatings. No sulfide minerals were observed. The footwall is hornfels and the hanging wall is sheared hornfels and quartzite 10 to 15 feet wide.

Development: The east vein is explored by a deep, steeply inclined shaft at its north end. About 175 feet to the southeast and 100 vertical feet below is a caved drift adit, which may have once joined the shaft. Several pits, trenches, and steeply inclined shafts explore the vein about 1,500 feet farther southeast.

The west vein is explored by 2 deep vertical shafts about 300 feet apart. An open-cut about 10 feet deep and 100 feet long extends northwest along the vein from the northern shaft.

Production: Undetermined.

References: None.

C.H.G. 5/18/61.

Captain Jenks Claim

See Ruby Lee Claim and Millsite.

Carlos Jr. Mine

Location: SE $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., and the W $\frac{1}{4}$ sec. 6, T. 2 S., R. 10 E./ S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, about 8.7 miles S. 29 E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Carlos J. Bassler, Jr., 2112 Cedar Street, Alhambra, owns several unpatented claims (April 1959).

History: Work apparently has been done as long ago as 1945, and every year since. Most of it appears to have been done in the past 14 years although one shaft may be much older.

Geology: In the SE $\frac{1}{4}$ of sec. 1, about $\frac{1}{4}$ miles southwest of the Silver Scorpion gold mine, hornblende granite ^{cross-cut by} ~~crisscrossed with~~ fine-grained green basic dikes, as much as one foot thick, and tan to brown White Tank quartz monzonite intrude the Pinto gneiss. The same rock types occur in the W $\frac{1}{2}$ sec. 6, T. 2 S., R. 10 W., about 1,000 feet northeast of the Silver Scorpion gold mine (figs. 1 and 2). In addition, the Gold Park gabbro-diorite is exposed in a southeast-trending adit (fig. 2). This area is much faulted and hematite and gold (?) bearing milky quartz veins are prevalent in the fractured zones. Thin pegmatites, and fine-grained green basic dikes have been exposed in most of the major workings and in nearly every prospect.

Development: Southwest of the Silver Scorpion gold mine a boarded-over, shaft is sunk to an unknown depth in hornblende granite. Immediately south of the shaft is an adit driven east about 15 feet (fig. 1). Northeast of the Silver Scorpion gold mine are 2 shafts, 3 adits, (a few wooden and brick swellings) and 13 ^{not in operation on the} prospects (figs. 1 and 2). ^{The mine was ~~idle~~ ~~in~~ ~~operation~~ ~~on~~ ~~the~~ ~~prospects~~ ~~(figs. 1 and 2).~~ ~~In February and April~~ ~~days of the field visits.~~ ~~and no operation was in progress.~~ ~~1959 the mine was idle.~~}

Production: Undetermined.

References: None.

J.R.E. 2/11/59 and 4/13/59.

Figure 2/. Geologic sketch map of a part of the
Carlos Jr. gold mine.

Cathy Jean Mine

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25 (proj.), T. 1 S., R. 23 E. S.B.M., Vidal quadrangle, 1950; in a shallow ravine on the extreme northern margin of the Riverside Mountains 4 miles south-southwest of Vidal.

Ownership: Undetermined (1958).

History: Undetermined.

Geology: The rocks in area of the Cathy Jean are hornfelsic-to gneissic. They are cut by a mineralized fault and a basic dike. The dike appears to have been intruded along the fault; both strike N. 75° W. and dip 85° NE. In addition to the dike, veinlets and lenses composed of iron oxides, chrysocolla, malachite, barite, and quartz, form a vein or zone, which reaches a maximum width of 6 feet in the plane of the fault.

Development: Two inclined shafts of undetermined depth were driven to the northeast at angles of 70° to 80° in search of gold. The lower of the 2 shafts enters the vein from near the bottom of the ravine. The vein is about a foot wide at the collar and appears to pinch out to the southeast. The upper shaft follows the same vein to an unknown depth. It is about 300 feet northwest of the lower shaft, and about 50 feet higher, on the west side of the ravine. At the collar of this shaft the vein is exposed in its maximum thickness. It appears to pinch out in a few tens of feet to the northwest but it is not well exposed. In the lower shaft the basic dike is the foot wall of the vein and in the upper shaft it is the hanging wall. Though the relation of the dike to the ore was not determined, mineralization resembles that of other mines in the area in which no basic dikes are associated with the ore bodies.

Though a road is open to the mine, no structures or equipment are present. The shafts are open and dry but dangerous to enter.

Production: Undetermined.

References: None.

R.B.S. and C.H.G. 12/18/56.

Gold

Chuckwalla Group

See Bryan mine.

Chuckwalla and Model Group

See Bryan Mine.

Chuckwalla Spring Placers

Location: Secs. 9, 10, and 16 (proj.), T. 8 S., R. 17 E., S.B.M., Chuckwalla Spring quadrangle, 1953; 12½ miles southwest of the junction of Blythe-Niland Road and U. S. Highways 60 and 70, a point 25 miles west of Blythe.

Ownership: An undetermined number of unpatented claims are, or have been, held in this area but most of them appear to be abandoned (1959). The Lost River (figure ___/) and Old Channel claims are currently (1959) held by Ben I. Brewer, 4920 Druid Street, Los Angeles 32. These claims are in sec. 9, near the road to Chuckwalla Spring.

History: According to local residents these gravels were worked by small-scale, hand methods during the 1930's. Since then activity has been sporadic. Mr. Brewer has held his claims since 1956.

Geology: This gravel deposit overlies the ~~shelved or~~ pedimented north edge of the Chuckwalla Mountains. Over most of this irregular bedrock surface the gravel appears to range from 0 to as much as 100 feet in thickness. In local, small areas the gravel is much thicker. Both the gold-bearing gravel and the underlying bedrock have been trenched by water courses heading in the range to the southwest (fig. ___/). The fault bounding the north slope of the range is exposed in the walls of a northeast-trending wash in section 10. Northeast of this fault the gravels dip more steeply into a down-faulted basin of undetermined depth. To the extent that the gold is concentrated on the bedrock this fault is a natural northeast limit for the deposit. According to Mr. Brewer however, there are many layers of hardpan in the gravel and gold has been found on these "false bedrock" surfaces. Presumably such layers extend northeast across the fault. The gravel is a poorly sorted mixture of subrounded fragments of igneous and metamorphic rocks in sizes ranging from silt to boulders several feet in diameter. Flat, flag-like fragments are common and commonly lie in a shingled arrangement. Relatively unworn nodules of chalcedony are present in fair profusion on the surface of the deposit, apparently having been derived from volcanic rocks to the southwest.

Local residents report that this is not a rich deposit but some spots have payed well. The presence of silt and clay-sized material makes a clean separation of the contained gold difficult but this may be overcome in part by working the loose, relatively clean reworked material in the present water courses.

Development: Mining of this deposit has consisted of shallow pits and shafts, short adits, and trenches -- what miners would call coyoting or gophering. In addition shallow benches have been cut on favorable streaks exposed in gullies (fig. ___/). The gold has been concentrated by a variety of small dry-washing devices in the absence of a dependable water supply. Accurate figures on the abundance of the metal in the gravel are lacking.

Production: Undetermined. ~~Adit 1958~~

References: None.

R.B.S. 11/19/59.

C.O.D. Mine

Location: Sec. 2 (~~proj.~~), T. 7 S., R. 15 E., S.B.M.,
U. S. Army Corps of Engineers Chuckwalla quadrangle, 15',
1945; about 1 mile south of Aztec Well and 6½ miles south
of Desert Center, in the Chuckwalla Mountains. ~~The~~ An
unimproved road ~~which~~ extends southwest from U. S.
Highways 60 and 70 to the Corn Spring-Aztec Well area.

Ownership: C. E. Squires, P.O. Box 437, Desert Center.

History: In the years 1939-40 the C.O.D. was operated
by Carl De Vault, Desert Center. The present owner has
been cleaning out the old shafts and installing timber
and sheathing as assessment work.

Geology: Crushed quartz veins ranging from 0 to 2
feet in thickness lie in a fault zone as wide as 4 feet.
The strike is N. 20° W., the dip is vertical. The veins
are poorly exposed for a strike distance of about 500
feet. They contain pockets and fissure fillings of
iron oxides which bear free-milling gold. Pyrite is
present but largely confined to the extreme southeast
end of the outcrop.

Development: Development consists of 2 vertical
shafts sunk on the fault zone about 15 feet apart at
the northwest end of the outcrop. They are 25 and 30
feet deep. To the southeast the deposit has been
probed through 5 shallow prospects.

Production: According to U. S. Bureau of mines records (published with permission of the owner) in 1939 and 1940, 10 tons of ore were shipped from which 5 ounces of gold and one ounce of silver were recovered.

References: None.

R.B.S. 4/29/59.

Combination Quartz Mining Claim No. 1

Location: NW $\frac{1}{4}$ sec. 12 (?), T. 4 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; southeastern Hexie Mountains, Joshua Tree National Monument, at the north edge of upper Porcupine Wash.

Ownership: Chester A. Pinkham and Charles W. Landford (1935). Undetermined (1961).

History: Claim located by Pinkham and Landford in July 1935. Apparently some development work was done in the 1930's. Idle.

Geology: Shear zone in fine-grained quartz monzonite. The shear zone contains an iron-stained quartz vein as much as 2 feet wide which strikes N. 55° W. and is vertical.

Development: The quartz vein is explored by means of a vertical shaft 15 feet deep joined at the bottom to a southeast-trending drift of unknown length. Two shallow pits have been opened on shears about 25 and 75 feet up hill from the shaft.

Production: Undetermined.

References: None.

C.H.G. 5/18/61.

C-13

Copper Giant (?) Mine

Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 28, T. 4 S., R. 9 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; in the Little San
Bernardino Mountains at the east edge of Rockhouse (Fargo)
Canyon, 11 miles northeast of Indio.

Ownership: Undetermined.

History: Locally said to have been worked by Herman
Price, Desert Center, who did the last work in 1915.
Apparently long idle.

Geology: Banded quartz-biotite gneiss and quartz
monzonite gneiss with biotite schist layers (Pinto
gneiss). Banding trends N. 45° E., dips 40° SE. No
evidence of mineralization or shearing was observed
at the adit portal. A few pieces of vein quartz 2 to
6 inches thick with very sparse iron oxide stains were
found on the dump.

Development: Adit driven W. 70° E. Size of dump sug-
gests several hundred feet of underground workings.

Production: Undetermined.

References: None.

C.H.G. 5/20/61.

Corona (Peggy) Mine

Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 32, T. 4 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7 $\frac{1}{2}$ ', 1953; about 6 miles west
of Ferris *(see map)*.

Ownership: Undetermined.

History: U. S. Bureau of Mines records indicate
this mine operated in 1939 at which time it was owned by
John Seipel, Ferris. No other record was found.

Geology: A poorly-exposed quartz vein crops out on
the north slope of a diorite ridge for a distance of
roughly 500 feet. The vein strikes S. 75° E., dips 25°
SW. and is as much as 4 inches thick. It is sparsely
stained and pocketed with iron oxides and contains scattered
biotite mica crystals.

Development: The vein is explored by one short adit
and 2 inclined shafts grouped within 100 feet of each other.

The adit ^{or west working} is about 15 feet long and is boarded
up for storage space. The 2 inclined shafts, the middle
and east ^{working} shaft, are near a dirt road extending west from
the adit. The middle shaft is inclined 20°, S. 65° E. to
an inclined depth of 60 feet. Although a vein 3 inches
wide is exposed at the portal, no similar body was seen
in the shaft. The east shaft was driven S. 35° ^E at a
10° inclination for a distance of 30 feet on the vein.

Production: In 1939, 25 tons of ore yielded four ounces of gold and two ounces of silver. ~~Idle (1959).~~

References: U. S. Bureau of Mines files, San Francisco.
R.B.S. 6/19/59.

Cow Bell Mine

Location: Secs. 2 and 10, T. 2 S., R. 11 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, about 7 miles south of Old Dale, on the Twentynine Palms Highway.

Ownership: Undetermined.

History: Undetermined.

Geology: In the mine area quartz monzonite is cut by several steeply-dipping minor faults of random orientation. The faults contain discontinuous pods and stringers of chalcopyrite and gold-bearing quartz. The largest observed stringer was about 1-foot wide. At location 1, figure 1/, where older alluvium has nearly obscured the bedrock, a shaft is sunk at least 100 feet in a N. 10° W.-striking and 75° SW.-dipping fault. At location 2, a shaft is sunk at least 50 feet in a N. 60° E.-trending and 75° SE.-dipping fault zone as much as 3 feet wide. The shaft at location 3 is only 15 feet deep and is sunk in a sinuous but generally northwest-trending and 70° SW.-dipping fault. At location 4 a shaft is sunk about 30 feet in a north-trending vertical fault.

Development: The 100-foot plus shaft at location 1, figure 1/ probably contains drifts on several levels in the fault plane. Shallow pits and trenches have exposed the fault several tens of yards along its surface course. Workings total an estimated 200-300 feet. The 50-foot plus shaft at local 2, has a drift about 20 feet southwest on the 10-foot level, and probably has drifts at lower levels in the fault plane. Total workings are estimated to be about 400 feet. Here also shallow pits and trenches have exposed the fault several tens of yards along its course. Shafts at ^{location} locals 1 and 2 are readily accessible but for those at 3 and 4, foot travel is necessary. The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 3/28/60

Figure 1/. Geologic sketch map showing the location and distribution of the workings at the Cow Bell Mine.

Crescent (Baumonk) Mine

Location: Sec. 1, T. 7 S., R. 14 E., S.B.M., U.S. ^(proj.)

Army Corps of Engineers Chuckwalla Mountains quadrangle, 15', 1945; on the southwest edge of the Chuckwalla Mountains about 10 miles, by dirt road, south of U.S. Highways 60 and 70. The Baumonk mine is marked on the topographic map but this appears to be a former well, reservoir, and/or mill site.

Ownership: Joe B. McNeil, and others, 11704 S. Vermont, Los Angeles (1959).

History: The Crescent is a new development, located in 1954 in search of uranium minerals, at the site of the old Baumonk gold mine. The older mine seems never to have been recorded in the literature. According to the owner of the Crescent, who talked with the aging Mr. Baumonk, the Baumonk mine was worked late in the last century. The ore was shipped from San Diego to England to be smelted.

Geology: The Crescent mine explores a fault zone the erosion of which has formed shallow ravines on opposing sides of a low ridge of gneissic rocks. This zone of fractured rock is as much as 18 feet in width. It strikes N. 15° E. and is vertical. Because of dust in the workings and regolith on the surface the nature of the mineralization was not clear. According to Walker and others, (1956, p. 26) -- "Radioactivity was noted in a zone of iron- and manganese-stained altered rock that is 12 feet thick and traced for 150 feet. Radioactivity 10 times background count is concentrated in a zone 2½ feet thick within the zone of altered rock. Samples collected by the U. S. Atomic Energy Commission assayed as high as 0.094 percent equivalent uranium."

The owner states that autunite has been identified in samples from this deposit.

The Baumonk claims covered an undetermined number of quartz veins poorly exposed for about 300 feet across the slope adjacent to and northwest of the Crescent. These veins are as much as 2 feet in width. They strike N. 40° E.; their dip ranges from vertical to 50° NW. Oxides of iron occur as small pockets and veinlets in the quartz as with ^{most} ~~all~~ of the free-milling gold ores of the Chuckwalla Mountains.

Development: The Crescent mine is entered through an adit driven 100 feet northeast on the fault zone. About 50 feet from the portal a raise extends to the surface; 60 feet from the portal there is a 40 foot winze.

The principal development on the Baumonk is a vertical shaft of undetermined depth about 35 feet west of the adit portal of the Crescent. The remaining development comprises a 10-foot shaft, a 30-foot inclined shaft and an open pit 15 feet deep. These openings are grouped in a broad triangle about 150 feet west of the deep shaft.

Production: No shipments have been made from the Crescent (June 1959). The tonnage shipped from the Baumonk was not determined. Some of the ore is reported to have been rich but ore presently accessible in the shallow workings averages about \$18 per ton in gold. (J. B. McNeil, personal communication).

References: Walker, and others, 1956, p. 12, 26.
R.B.S. 4/30/59.

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Dalton Mine

Location: Sec. 24 (?), T. 2 S., R. 11 E. (?) and sec. 19 (?), T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Pinto Mountains, about $3\frac{1}{2}$ miles southwest of the Gold Crown mine and $2\frac{3}{4}$ miles northeast of Pinto Mountain (see pl. 3/).

Ownership: Undetermined.

History: Apparently the mine was discovered and operated during the 1930's.

Geology: The main workings of the mine are near the head of a small northwest-trending box canyon and high on the northeast slope of the adjacent ridge. In this area the country rock is quartz monzonite cut by a major north-northeast-trending and 65° - 70° west-dipping fault containing a chlorite-rich quartz vein $1\frac{1}{2}$ feet in average thickness. The fault cuts the canyon at nearly right angles and is visible in both ridges on either side of the canyon, a distance of about $1/10$ of a mile.

Development: The main shaft is sunk on the vein at least 100 feet. Judging from the size of the dump there must be drifts on one side or more levels. Total workings are estimated to be at least 1000 feet. An adit opens directly northeast of the shaft and is driven in the plane of the fault about 200 feet into a north-west-trending ridge. A few yards past the hill crest the adit has been stoped 18 feet to the surface over a distance of nearly 35 feet. The adit ends 18 feet below the ground surface in a shaft sunk on the vein at least 80 feet. There are several minor shafts and adits about 3/4 of a mile southeast of the main workings near an abandoned campsite. Principal among these is a north-trending drift driven in a 80° west-dipping fault. The drift was not entered but is estimated to be 200-300 feet long. Narrow, and in many places, steep roads provide access to the mine area.

Production: Undetermined.

Reference: None.

J.R.E. 3/30/60

Desert Gold Group

See Meek Mine and Thelma Group.

Desert King Mine

Location: Sec. 14, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 3 miles north-northeast of Mission and Sunrise Wells (pl. 3/).

Ownership: Apparently Wilbur E. Cummings et. al., Los Angeles, still own 2 patented claims; the Big Cross and the Desert King.

History: The Big Cross claim was located June 12, 1897, and the Desert King claim January 1, 1897. Most of the work was done prior to 1900 when the survey for patent was made, but the mine was active in 1938 for a short period of time.

Geology: Massive quartz monzonite is probably cut by faults containing quartz veins. No field visit was made to the property and nearly all information given here comes from the patent plat (fig. 1/).

Development: The main workings consist of a tunnel (adit) driven west about 150 feet. Other work is of minor extent and restricted to shallow shafts and prospects (fig. 1/). The mine is idle.

Production: In 1938 the Desert King mine yielded 18 tons of ore from which 3 ounces of gold and 1 ounce of silver were recovered.

References: Saul, 1962, p. 7. J.R.E.

Figure 1/. a Plat of the Desert King and Big
Cross lode claims (Survey No. 3831; surveyed in December
1900; patent No. (vol. 365, pp. 341-344) issued March
17, 1903).

Desert Queen (McHaney) Mine

Location: SW $\frac{1}{4}$ sec. 5, and SE $\frac{1}{4}$ sec. 6, T. 2 S., R. 9 E., S.B.M.; Twentynine Palms quadrangle, 1955; Joshua Tree National Monument, about 7.8 miles S. 7° W. from Four Corners, Twentynine Palms and 1.4 miles northwest of Split Rock.

Ownership: William F. and Francis Keyes, P. O. Box 114, Joshua Tree, own 8 unpatented claims and a 5-acre mill site. Six of these claims have been submitted for patent (March 1959).

History: The mine has a recorded production as long ago as 1895. ^{Through 1900} (~~Near and at the end of the 19th century,~~) a production of 3,701 oz. of gold is recorded. In 1895 Jim McHaney loaded about 200 pounds of gold "matte" worth \$40,000, processed by amalgamation at a 2-stamp mill at Pinyon Well, aboard a horse drawn wagon and transported it to San Bernardino (William F. Keyes, oral communication, 3/18/59). The gold-quartz ore was taken from the "Rats Nest", a natural opening at first, and ran \$1 a pound (William F. Keyes, oral communication, 3/18/59). A small force of men was employed at this time (Crawford/p. 310). ^{1896,} The mine was active from 1912 through 1914 and again in 1923.

recovered at beginning of 1895 and 1900 and 1912 and 1923.

From 1932 to 1941 the mine was in nearly continuous operation. ~~During the early part of the 20th~~
~~century~~ ¹⁹¹²⁻¹⁹¹⁴ the gold-quartz ore was processed by means of a 5-stamp mill which included a Blake jaw crusher, 20-ton Herman Ball mill and a Wilfley table. The plant was driven by a 12-h.p. Lambert gas engine (Tucker and Sampson 1929, p. 477). It was located at the present site of the Keyes ranch about 6 miles N. 75° E. of the mine. In the 1930's and early 1940's the ore was processed in a 2-stamp mill built by W. F. Keyes. It is about 4 miles N. 75° E. from the mine in the SW $\frac{1}{4}$ sec. 34, T. 2 S., R. 8 E.

Geology: The mine workings are near the top of a steep northwest-trending ridge cut in the White Tank quartz monzonite, and just south of a sharp contact with the Palms quartz monzonite. A steep N. 70° E.-trending canyon is cut along the contact between the two rock types (fig. 2/).

Gold-bearing quartz veins and pockets, and pegmatite, aplite, and green basic dikes occur locally and are extensively explored by mine workings.

Development: Ore has been mined from at least 8 adits and 6 shafts at an elevation of about 4400 feet. The principal workings are at and near the top of a steep ridge (figs.  and ). Several closely spaced nearly vertical shafts, sunk on a natural opening ("Rats Nest") in the country rock, extend down 60 to 75 feet to the main adit level. The area surrounding these workings is extensively blasted and caved and they are actually near the center of a large open cut. A few tens of feet northwest of these shafts is an adit, in poor condition which probably contains a winze sunk 50-75 feet to the main adit level, ^{or} (for) which a geologic sketch map has been prepared (fig. ). The main adit level consists of at least 1,000 feet of drifts, crosscuts, raises, winzes, and stopes. Part of the workings have been backfilled with gangue.

Traveling north and up the jeep trail to the main adit, over a distance of about 300 feet, one passes by an adit driven east about 75 feet, a shaft inclined 45° E. and sunk to a depth of approximately 80 feet, and another shaft inclined 45° NE. and sunk to a depth of approximately 60 feet (fig. 2/). Below and 200 to 300 feet northeast of the main adit are 2 adits driven northeast about 60 feet each. Across the canyon to the northwest an adit is driven north and across a gulch to the east 2 adits are driven southwest (fig. 3/). ~~These workings were not visited.~~ The mine is idle.

Location: Coal

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude ore (tons)	Recoverable Metals	
		Gold (ounces)	Silver (ounces)
1895	-	1,209	-
1896	-	2,419	-
1900	-	73	-
1912	39	48	23
1913	5	7	2
1914	7	23	4
1923	1	2	1
1932	5	5	2
1933	5	4	1
1934	6	11	3
1935	5	2	1
1937	145	28	46
1938	2	5	1
1939	10	5	2
1940	8	2	1
1941	5	2	-

References: Crawford, 1896, p. 310; Tucker and Sampson, 1929, p. 477.

J.R.E. 3/18/59

Figure 2. View north toward the Desert Queen mine. Note the contrast in rock types on the north and south sides of the canyon (fig. 1).

Figure 1. Geologic map showing the location and areal distribution of the workings of the Desert Queen mine. (topography and land grid from 15' Twenty-nine Palms quadrangle).

Figure 1. Geologic map showing the location and areal distribution of the workings of the Desert Queen mine.

(topography and land grid from 15' Twenty-nine Palms quadrangle).

Desert Queen mine, Twenty-nine Palms quadrangle, California.

Figure 3. Geologic sketch map of the main adit
level, Desert Queen mine.

Dr. Musick Mine

Location: NW $\frac{1}{4}$ sec. 19 (proj.) T. 4 S., R. 4 W., S.B.M., Steel Peak quadrangle, 7.5', 1953; about 6 miles west of Perris and three-quarters of a mile north and east of the Gavilan Mine.

Ownership: H. A. Martin, Route 2, Box 95B, Perris (1959).

History: This mine was leased at one time by a man named Dr. Musick whose name it now bears. According to the present owner the mine has changed hands several times but the dates and periods of active mining were not determined.

Geology: A quartz vein strikes N. 5° W., across the northeast side of a shallow ravine cut in diorite and dips about 70° SW. The vein ranges from an inch or two up to a foot in thickness but is poorly exposed and its lateral extent was not determined.

Development: An 80-foot shaft was sunk on the vein. According to the owner there are two 100-foot drifts but these were not accessible because of water which has flooded the mine to within 30 feet of the surface.

Production: Undetermined.

References: None.

R.B.S. 6/16/59.

Dos Palmas (Black Jack Claim) Mine

Location: Sec. 16 (3), T. 7 S., R. 12 E., S.B.M.,
(proj.)
U. S. Army Corps of Engineers Canyon Spring quadrangle,
15', 1944; 3½ miles northwest of Clemens Well, on the
south slope of the Orocopia Mountains. The mine is
reached by an unimproved dirt road up a wash which
leaves the range near the triangulation station marked
Can 890 on the topographic map.

Ownership: Undetermined. The claims were held in
1955 by John C. Brinton, Eileen Brinton and George W.
Robinson, under the name Black Jack Claims.

History: This property was first described in 1894
by which time one adit was 90 feet long, and one 190
feet long (Crawford, 1894, p. 221). Subsequent reports
add nothing that suggests activity later than the 90's.

Geology: The country rock is gneiss. A quartz
vein lies in the plane of a fault which strikes N. 55° E.,
and dips 50° - 55° NW. The fault zone is as much as 5
feet wide and contains a soft gouge of chlorite schist.

It is well exposed for several thousand feet across
several ridges and intervening canyons. The full
northeasterly extent of the fault was not determined
but to the southwest it is truncated by a wide, north-
west-trending fault zone which probably is part of the
San Andreas system.

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The quartz vein pinches and swells, ranging from 0 to 4 feet in thickness. It is fractured. Contained pyrite is altered almost completely to iron oxides which have filled fissures and cavities. Small amounts of secondary copper minerals and calcite are present. Several samples of ore contain visible traces of gold but no assay data were found.

Development: The vein was explored by means of adits driven northeast on 3 levels in the southwest slope of a ridge immediately north of a mill and camp site (fig. ___/). ^{The} ~~All 3 adits are driven northeast and~~ are joined by stopes which appear to be as much as 30 feet wide. The ground stands well, being only slightly caved at the portals. The adits are untimbered. The stopes are timbered with stulls. Ore was milled at the mine but water was probably in short supply.

Production: Undetermined.

References: Crawford, 1894, p. 221; Merrill and Waring, 1917, p. 541; Tucker and Sampson, 1929, p. 477; 1945, pl. 35.

R.B.S. 2/25/60.

Dottie Welborn Claim

Location: Sec. 31 (?), T. 6 S., R. 15 E., S.B.M., U. S. Army Corps of Engineers Chuckwalla Mountains quadrangle, 15', 1945; just east of the mill site labeled Red Cloud Mine on the quadrangle map, and about 8 miles by dirt road southeast from a point on U. S. Highways 60 and 70 about one mile west of Skylark Ranch (fig. ___).

Ownership: Undetermined.

History: A patent was issued on the Dottie Welborn, in 1904, to the Red Cloud Mining Company. No published reference to this claim was found.

Geology: The country rock is contorted gneiss cut by pegmatite dikes ranging from 0 to 4 feet in thickness. As far as could be determined, no gold-bearing deposit is exposed on the surface or in the workings, a possible exception being the northwest end of the claim where a zoned pegmatite dike as much as 3 feet wide has been opened by a prospect pit. The dike strikes N. 45° W. and dips 65° NE. The walls of the dike comprise zones of quartz and feldspar as much as one foot wide. The uneven central zone is translucent quartz pocketed with oxides of iron derived from the alteration of sulfides.

Development: Exploration was centered at the southeast end of the claim near a campsite and the road. It consists of a 50-foot vertical shaft in gneiss on the north side of the canyon and an adit driven 20 feet southeast into the south wall of the canyon. The claim appears to have been used primarily as a camp site and possibly as a mill site.

Production: Undetermined. (1960).

References: None.

R.B.S. 2/8/60

Double Jack Claims

Location: W $\frac{1}{2}$ sec. 19, T. 6 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; at the south end of the McCoy Mountains, on the west slope of a north-trending ridge.

Ownership: J. J. Rakocy, 527 N. Kenmore Ave., Los Angeles (1960).

History: The Double Jack Claims were located recently (probably in 1959) but appear to include parts of older claims for which no data were found.

Geology: The area is underlain by schistose meta-sedimentary rocks which strike N. 25°-35° W., dip 10°-15° NE. and are cut by mineralized faults. Two systems of faults appear to be present. One comprises faults which strike N. 60°-70° W. and cut the planar structure of the country rock at high angles. The other faults appear to be essentially parallel to the structure of the country rock. The two systems differ mineralogically. The faults which truncate the country rock contain lenticular bodies of massive quartz as much as 5 feet in thickness containing minor proportions of specular hematite, calcite, and chlorite. Those faults which parallel the structure contain, in addition to the above minerals, small pockets and crusts of secondary copper minerals, but appear not to be as wide as those of the other system and have more irregular boundaries.

Duplex Mine

Location: Sec. 14 (?), T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 3 miles north-northeast of Sunrise and Mission Wells (see pl. 3/)

Ownership: Earl and Rose Geiger, 2109 N. Durfee, El Monte own at least 1 unpatented lode claim (March 1958).

History: Apparently part of the Standard-Duplex Group owned in 1933 by J. F. Darling, Indio, and Wesley McGrath, Los Angeles (Tucker, 1933, unpublished Field Report No. 122). At this time little more than assessment work had been done.

Geology: A north-northwest-striking and 77° SW.-dipping fault cuts quartz monzonite. The fault zone is 1-foot in average thickness and contains thin quartz stringers near the ground surface.

Development: A shaft is sunk at least 100 feet in the fault plane. There are probably drifts at one or more levels. Total workings are estimated to be about 400 feet. The mine was not in operation on the day of the property visit.

Production: Undetermined.

References: Tucker, 1933, unpublished Field Report No. 122.

J.R.E. 3/10/60.

Edith Claim

See Mammoth Group.

El Dorado Mine

See New El Dorado Mine.

Elton Mine

Location: SW $\frac{1}{4}$ sec. 8, T. 2 S., R. 9 E., S.B.M.,
Twentynine Palms quadrangle, 1955; Joshua Tree National
Monument, about 8.7 miles S. 5° W. from Four Corners,
Twentynine Palms and 0.7 of a mile west of Split Rock.

Ownership: Undetermined.

History: Undetermined.

Geology: The mine workings are in gray to brown,
medium-grained massive quartz monzonite which is
intruded by numerous aplite dikes, as much as 1-foot
thick, and a few thin veins of milky quartz.

Development: Four very old vertical shafts, all at
least 50 feet deep, have been sunk in the quartz
monzonite over a southwest-trending, rectangular area
about 500 by 200 feet at an elevation of 3,320 feet.
The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 2/13/59

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Enspiration Mine

See: Hidden mine.

Eureka Group

Location: Sec. 6 ? (proj.), T. 7 S., R. 15 E.,
S.B.M., U. S. Army Corps of Engineers Chuckwalla
Mountains quadrangle, 15', 1945; in a narrow canyon
in the southwest margin of the Chuckwalla Mountains
about 12 miles, by dirt road, southeast of U. S.
Highways 60 and 70.

Ownership: Richard T. Ransdell and others, 1680
Main Street, Brawley (1959).

History: Undetermined.

Geology: These claims appear to lie along a poorly
exposed fault zone which cuts contorted gneissic rocks.
It strikes N. 45° W. and dips shallowly to the south-
west. An alignment of saddles and ravines suggest
that this fault might be traced as far as 2 miles to
the northwest and 1 mile to the southeast of the claims.
The fault zone contains lenses and stringers of
fractured vein quartz associated with chalcopyrite,
oxides of iron, malachite, chrysocolla, calcite, and
an undetermined percentage of free-milling gold. The
quartz veins appear to be as much as a foot in width.

About a quarter of a mile west of the above described fault another fault is exposed for about 300 feet on a ridge at the mouth of the canyon. Here, 2 quartz veins as much as a foot wide contain small concentrations of galena, lead carbonates, chrysocolla, malachite, and oxides of iron. These veins strike west and dip 30° south. Here too, the country rocks are gneissic.

Development: Development on the Eureka group of claims comprises a discovery shaft at the southeast end of the property and access roads and bulldozer cuts.

Development of the western veins appears to represent activity on an older claim. It consists of 2 inclined shafts, both 25 feet deep. One is on what appears to be the most extensive vein and the other, some 60 feet farther east and about 40 feet up the slope to the south, explores a more poorly exposed, parallel vein.

Whether or not the western group is part of the holdings of the Eureka group was not determined.

Production: Undetermined.

References: None.

R.B.S. 4/30/59.

Frank Hill (Star) Mine

Location: Sec. 13 (?), T. 2 S., R. 11 E. (?), S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Pinto Mountains, about 3½ miles west of the Gold Crown mine and close to 3 miles north-east of Pinto Mountain (see pl. 3/).

Ownership: Alice and Vincez Zimmerman, 19073 Slover, Bloomington own 4 unpatented lode claims (March 1958).

History: Apparently the mine was originally located in the early 1930's by the Frank Hill Mining Company, Frank Hill, president, R. Gfeller, secretary, Twentynine Palms (Tucker and Sampson, 1945, p. 130). The mine was active in 1936, but was then owned by Vincez Zimmerman who had renamed it the Star mine.

Geology: Tucker and Sampson (1945, p. 130) report a 4-foot quartz vein in granite (quartz monzonite) which strikes north and dips 40° W. Probably the vein occurs along a fault.

Development: A shaft is sunk on the vein to a depth of 225 feet. There are drifts on the 50, 100, and 200-foot levels (Tucker and Sampson, 1945, p. 130). On the day of the property visit the mine was not being worked and the shaft was locked. As a result no new information can be added concerning either the geology or the workings. The mine access road is narrow and in large part in poor condition.

Production: A record of production for only one year was found, but judging from the reported extent of the workings there may well have been more. The record was compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude Ore (tons)	Gold (oz.)	Silver (oz.)
1936	5	2	1

References: Tucker and Sampson, 1945, p. 130.

J.R.E. 3/30/60

Goat Basin Mine

See Boss or Goat Mine.

Goat Mine

See Boss or Goat Basin Mine.

Gold Coin Mine

See: Gold Galena mine.

Gold Crown #2 Mine

See Rich Gold Mine.

Gold Crown (Bon Ton) Mine

Location: Secs. 10 and 15, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountain, about 3 miles south of New Dale (Site) and about $4\frac{1}{2}$ miles south of the Supply mine (pl. 3/). The information given under History, Geology, and Development is taken largely from previous descriptions of the mine by Tucker and Sampson, (1945, p. 130 and 1929, pp. 478-479).

Ownership: H. G. Frydenlund, Box 704, Twentynine Palms, owns 3 unpatented claims; the Bon Ton, Gold Crown No. 12; and the San Bernardino (March 1958).

History: Denny Pardu, San Bernardino, located the San Bernardino claim in 1896 (Tucker, 1934, unpublished Field Report No. 123). In 1926 the property comprised 25 claims and was owned by the Gold Crown Mining Company, George A. Novell, president, Monrovia. The Gold Crown Mining Company operated the mine intermittently from 1926 to 1938. A 50-ton cyanide plant was built on the property in the early part of 1935 (fig. 1/), and treated ore from the Gold Crown and Nightingale (San Bernardino County) mines until 1938, when the mill and all other equipment was moved to the Supply and Nightingale mines 6 miles north, in San Bernardino County. By this time ore had been depleted to a depth of 400 feet, and the claims were abandoned. The present owner operated the mine in 1940 and 1941.

Geology: The Gold Crown quartz vein trends N. 20° W., dips 75° W., and cuts quartz monzonite. It ranged in thickness from 4 to 8 feet and had an average value of \$12 per ton. There is also a series of parallel quartz veins striking N. 50° E., that intersect the Gold Crown Vein north of the main shaft. These veins range in thickness from 1 to 2 feet. About 2000 feet southeast of the Gold Crown shaft on the San Bernardino claim, the quartz monzonite is cut by a vein that strikes N. 15° W., dips 30° E., and ranges from 1-foot to 1½ feet in thickness. The average value was reported to be \$15 per ton in gold. The Gold Crown and San Bernardino veins both occur in shear zones and contain chalcopryite, hematite, and free gold.

Development: At intervals along the outcrop, the Gold Crown vein is developed by 4 shafts ranging in depth from 75 to 640 feet. The principal development work is confined to the double-compartment Gold Crown shaft (fig. 2/). It is sunk 640 feet on the vein with extensive drifts run at 100-foot intervals to and including the 600-foot level. Total work is about 6000 feet. Several ore shoots, which ranged from 75 to 100 feet in length and had an average thickness of 6 feet, were developed. Ore was stoped from the 400-foot level to the surface. Although 600 feet of drifts were driven on the 600-foot level, no commercial ore bodies were developed. About 100 feet north of the Gold Crown shaft, a second shaft is sunk on the vein to a depth of 100 feet. Apparently a raise from the drift on the 200-foot level ~~nearest~~ of the Gold Crown shaft connects with this shaft.

A shaft is sunk on the San Bernardino vein to a depth of 220 feet. Short drifts are run on the vein, both north and south, on the 40, 80, and 130-foot levels. About 30 feet west of these workings there is a parallel vein 6 inches thick which has been exposed by means of a shaft 20 feet deep.

Water was obtained from a well at Old Dale 9 miles north of the mine on the Twentynine Palms Highway. A concrete storage tank at the mine had a capacity of 18,000 gallons.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Gold Crown and Nightingale (?) Mines				
Year	Crude Ore (tons)	Gold (oz.)	Silver (oz.)	Copper (lbs.)
1935	6,039	1,666	1,740	11
1936	10,706	4,254	5,761	
1937	14,653	5,001	5,023	
1940	53	47		
1941	5	2		

References: Tucker, 1934, unpublished Field Report No. 123; Tucker and Sampson, 1929, pp. 478-479; Tucker and Sampson, 1945, p. 130.

J.R.E. 3/11/60/

Figure 1/. Fifty ton cyanide plant built in 1935 to process ore from the Gold Crown mine, Riverside County. Picture taken about 1936 by W. B. Tucker. View is northeast.



Figure 2. Gold Crown shaft and mining camp,
Riverside County. The mill is to the viewers right
and just out of the picture. Picture taken by W. B.
Tucker about 1936. View is east.

Gold Crown (San Diego) Mine

Location: NW¹/₄ sec. 4 (~~proj.~~), or NE¹/₄ sec. 5 (~~proj.~~),
T. 6 S., R. 15 E., S.B.M., U. S. Army Corps of Engineers
Chuckwalla Mountains quadrangle, 15', 1945; about 3
miles southwest of Desert Center.

Ownership: Chuckwalla Uranium Inc., c/o J. Rakocy,
527 N. Kenmore Ave., Los Angeles (1959).

History: In 1894 this mine was mentioned as a new
prospect under the name San Diego Mine. E. E. Bowles,
San Diego, was the owner. By 1896 a small amount of
development work had been done (Crawford 1894, p. 224;
1896, p. 313-314). In 1917 the San Diego Mine had been
abandoned (Merrill and Waring, 1917 p. 540). Between
an undetermined date, probably sometime in the late
twenties, and 1949, ^{mine was renamed} the Gold Crown ^{and} was held by the
owners of the Granite mine which is immediately north
of it. In 1949 the present owner bought the Gold
Crown from Henry K. Hennigh.

Geology: A vertical fault, mineralized with gold-bearing quartz veins as wide as 4 feet, strikes northwest down a granite ridge. It is exposed for about 300 feet. The southwest slope of the ridge is cut by northeast trending shears which dip 80° NW. and are only sparsely mineralized. Vein quartz and included cavity and fracture filling iron oxides are the chief minerals in this deposits. The owner stated (personal communication, J. Rakocy, Mar. 3, 1959) that the better ore runs as high as \$600 per ton in free-milling gold but did not describe the sampling technique employed.

Development: The former owner explored the north end of the main fault outcrop through 2 ^{show drift} shallow adits driven southeast. The lower of these adits is 30 to 40 feet long, the upper about 10 feet long. The present owner has prospected the vein outcrop several hundred feet farther up the ridge. Two adits were driven into the west slope with the object of crosscutting the vein.

The lower of these 2 adits follows the ~~crushed~~ footwall ~~zone~~ of a fault for about 170 feet without reaching the vein. A 20-foot winze is located about 20 feet from the portal. About 130 feet from the portal a crosscut extends 90 feet southeast. At the end of the adit an 18-foot crosscut was driven southeast and a 12-foot one northwest. The upper adit is about 100 feet up the slope and is about 55 feet long. A crosscut is driven 35 feet northwest from its face. Except for a narrow shear, exposed near its portal, the upper adit and appended crosscut are in barren rock.

Production: Undetermined.

References: Crawford 1894, p. 224; 1896, p. 313-314; Merrill and Waring, 1917, p. 540; Tucker and Sampson, 1929, p. 487.

R.B.S. 3/10/59.

Gold Cup Group

Location: Sec. 23 (?), T. 6 S., R. 13 E., S.B.M., U. S. Army Corps of Engineers Canyon Spring quadrangle, 15', 1944; on the northeast slope of the Orocopia Mountains, on the south side of a west-trending canyon, 2½ miles south of U. S. Highways 60 and 77.

Ownership: Undetermined.

History: This mine was held in 1945 by E. G. Sweeney, 355 Norton St., Long Beach. At that time it was idle. (Tucker and Sampson, 1945, p. 130-131, pl. 35). No previous or subsequent history was found.

Geology: The Gold Cup Group is in an area underlain by granitic rock. The 5 claims include a north-trending ridge cut by two faults. One fault strikes along the ridge N. 10° E. and appears to dip about 60° east-south-east. This fault is truncated by a second fault which strikes N. 60° W. through a saddle in the end of the ridge (fig. ___/) and dips 55° SW. The northwest-trending fault is exposed for about 450 feet across the ridge. The northeast-trending fault is well exposed for about 100 feet southwest of the junction. Irregular quartz veins lie in the planes of both faults. The northwest trending vein appears to be as much as 10 feet wide. The northeast-trending vein reaches a maximum thickness of about 20 feet near the junction of the faults and narrows to a foot or less to the southwest.

The quartz veins have been fractured and crushed, crushing being most pronounced near the hanging wall of the northwest-trending fault. Jasper, chalcedony, iron oxides, and traces of secondary copper minerals have partially recemented the broken quartz. Some of the iron oxide occurs as pseudomorphs after pyrite. The crushed vein material in the northwest-trending fault was reported to carry \$48 per ton in gold and a streak immediately against the hanging wall \$320 per ton. *(Tucker and Sampson, 1945, p. 130-131)*

These data were not checked.

Development: The deposit is opened by a shallow cut in which is a partially caved shaft filled to within 10 feet of the cut surface. In addition, bulldozer cuts have been made across the saddle, up the ridge, and down the west slope (fig. ___).

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 130-131, pl. 35).

R.B.S. 2/11/60.

#158
Gold Dollar Mine

DPS 1727

Location: SW $\frac{1}{4}$ sec. 36 (proj.), T. 1 S., R. 23 E., S.B.M., Vidal quadrangle, 1950; on the north slope of the Riverside Mountains 5 $\frac{1}{4}$ miles south of Vidal.

Ownership: John H. Ware, 408 N. 9th Street, Santa Paula (1958).

History: The earliest record of the Gold Dollar is a brief statement in the Fifteenth Report of the State Mineralogist (Merrill and Waring, 1917, p. 84) which gives the original number of claims, the location, the fact that only assessment work had been done at that time and the owners; "Messrs. Ware and McMillan, of Calzona". In 1929 the owner was Riverside Gold Mining and Milling Company, J. W. Ware, president, 363 Orizaba Avenue, Long Beach, California (Tucker and Sampson, 1929, p. 479). The Gold Dollar was reported idle in 1945 (Tucker and Sampson, 1945, p. 131). The last known activity on this property was in 1950 under lease to P. E. and Joe Bornig and Lynda Development Co.

Geology: The country rock in the Gold Dollar mine area is contorted gneiss interlayered with abundant thin quartzite units. A mineralized shear zone is exposed for about 1,000 feet down a steep ravine.

It strikes N. 15° W. and dips 65° NE. A gold-bearing vein, as wide as 8 feet fills the shear zone. The vein material is largely oxides, carbonates, and silicates of iron and copper. Hematite is the most abundant gangue mineral. Malachite and chrysocolla are intimately associated with the hematite, apparently having a common origin in chalcopyrite, small quantities of which remain unaltered in some of the ore. Quartz, barite, calcite, and manganese oxides, are also common in the vein.

Development: The mine was developed through 2 adits, one near the head of the ravine and the other about 300 feet down the slope. The upper adit was driven southeast about 65 feet to an ore body from which point a drift follows the vein S. 50° W. for a distance of 250 feet. At a point on the drift 80 feet from the adit a winze was sunk 60 feet on the vein. This work exposed an ore shoot 2 to 8 feet wide and 100 feet long. The vein is faulted at the southeast end of this shoot. The lower adit, which was 500 feet long in 1945 (Tucker and Sampson, 1945, p. 131) was driven S. 10° E. on or near the vein. The differing attitude of the deposits exposed in the upper and lower workings suggests mineralization on more than one fault.

Ore was transported down the ravine to the camp by means of an aerial tramway, now inoperable. The adits are reached by a steep trail from the camp-site below and were open and dry when visited (1957).

The road to the site follows the bed of a wash for most of its length and is in poor repair.

Production: The best year for this mine was 1932 during which it yielded 59 tons of ore from which 48.24 ounces of gold, 10 ounces of silver, and 1,691 pounds of copper were refined. In 1950, O. W. and Joe Boring and Lynda Development Co. removed 8 tons of ore from which 8 ounces of gold, 6 ounces of silver and 451 pounds of copper was recovered (U. S. Bureau of Mines records) published with permission of the owner.

References: Merrill and Waring, 1917, p. 544; Tucker and Sampson, 1929, p. 479; 1945, p. 131. R.B.S. and C.H.G. 12/20/57.

Golden Bee Mine

Location: Sec. 16, T. 3 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, about 7 miles southeast of White Tank, and about 1½ miles south of the Pinto Basin Road (see pl. 2/).

Ownership: Undetermined.

History: In 1935 the mine was owned by E. Auclair, Twentynine Palms; in 1936, by Ira Bond and E. Auclair; in 1937 by Edward H. Fishmer, 3551 Birchwood Street, Riverside; in 1938 by Gold and Vanadium Producers, Inc., Twentynine Palms; from 1939-1942 by E. Auclair, Twentynine Palms; and in 1945 by Golden Bee Mines, Ltd., E. Auclair, president and manager, Guy Pierson, secretary, San Bernardino (Tucker and Sampson, 1945, p. 132). The first record of gold-silver production was in 1935, and the last in 1942. Ore shipments made to Burton Brothers, Inc., Rosamond, Kern County, and the Gold Crown Mining Company's mill at Dale, San Bernardino County, are reported to have been from 1 - 6 ounces in gold per ton (Tucker and Sampson, 1945, p. 132).

Geology: The major workings are in Pinto gneiss which is cut by a north-trending major fault marked by a zone of gouge and breccia as much as 100 feet thick (fig. 1/). The crushed material is cut by irregular bodies of iron-stained milky quartz containing minor amounts of gold. Most of the other workings are along minor faults containing narrow quartz veins. About 175 feet east of the main shaft is a persistent ^{light gray} felsite (~~trhyolite~~) dike, ranging in thickness from 20 to 50 feet, trending slightly northwest and dipping east (fig. 1/).

Development: The main shaft is sunk at least 150 feet in the fault zone. It is open on the surface and down to the 30-foot level. About 80 feet southwest, two minor shafts are sunk to the 10-foot level. A drift extends from them 45 feet northeast to a winze which leads down to the 30-foot level. From here a drift leads northeast to intersect the main shaft at this level (fig. 1/). The area adjacent to the main shaft, from the surface down to at least 30 feet, is honeycombed with narrow and irregular passageways. The rest of the workings compose about 500 feet of adits, shafts, drifts, crosscuts, and stopes (fig. 1/). The mine is idle.

Production: Compiled by the U. S. Bureau of Mines
and published with permission of the owner.

Year	Crude ore (tons)	Gold (ounces)	Recoverable Metals Silver (ounces)
1935	30	5	
1936	207	345	44
1937	145	15	8
1938	101	30	8
1939	22	12	
1940	18	9	
1941	267	99	3
1942	23	7	3

References: Tucker and Sampson, 1940, p. 48-49; Tucker
and Sampson, 1945, p. 132.

J.R.E. 12/10/59.

Figure 1. Geologic sketch maps of the Golden
Bee Mine (topography from U.S.A.C.E. 15' Pinkham Well
quadrangle, 1943).

Gold Fields of America

Mine

Location: Sec. 5, T. 3 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Pinto Mountains, Joshua Tree National Monument, about 4.3 miles southeast of White Tank and 0.5 mile north of the Pinto Basin road (see pl. 2/).

Ownership: Undetermined.

History: In 1945 the property comprised 12 claims and was owned by Goldfields of America, Ltd., Otto Notterman, president, Frank Notterman, secretary, San Bernardino (Tucker and Sampson 1945, p. 131).

Geology: Both the mine and mill site areas are underlain by Pinto Gneiss, criss-crossed by minor faults containing iron-stained gold (?) bearing milky quartz veins (fig. 1/). In the mill site area the gneiss is intruded locally by White Tank Quartz Monzonite.

Development: One-quarter^{of a} mile northeast of the Gold Point mine in the mill site area, Southeast half a mile an adit is driven 200 feet southwest through a 57° southeast dipping shaft at the 25-foot level (Fig. 1/). The shaft continues about 90 feet below this level on the same inclination. The mine is idle.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 131.

J.R.E. 10/15/59

Figure 1/. Sketch map showing the areal distribution (A), and a geologic sketch map (B) of the Gold Fields of America mine (topography from U.S.A.C.E. 15' Pinkham Well quadrangle, 1943).

Gold Flake Claim

See Moser Claims.

Gold Galena (Gold Coin) Mine

Location: W $\frac{1}{2}$ sec. 9, NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 8, T. 3 S., R. 9 E., S.B.M., Lost Horse Mountain quadrangle, 1958; Joshua Tree National Monument, south face of the Hexie Mountains 1 $\frac{1}{2}$ miles east of Squaw Tank.

Ownership: Undetermined (1960).

History: The Gold Galena mine was discovered about 1900. In 1914 the Gold Galena Mining Company owned the property which is reported to have included nine claims in secs. 4, 8, and 9, T. 3 S., R. 9 E., S.B.M., with workings down 70 to 100 feet; no mill was on the property and no bullion had been produced (Merrill, 1917 (1919) p. 538). By 1917 the mine was apparently idle (Brown, 1923, p. 99). In 1920 W. F. Keys, Joshua Tree, located two claims (Pleasant Valley, Jackson) which cover the area most extensively explored. Mr. Keys does some intermittent development work.

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Geology: The Hexie Mountains are underlain mostly by banded quartz-biotite gneiss (Pinto gneiss). In the mine area an irregular body of granite, half a mile wide and a mile or more long, and three pods of coarse-grained hornblende gabbro crop out. An east-west shear zone is intermittently exposed across the mine area for more than half a mile. Where exposed in mine workings this shear zone strikes N. 60° W. to N. 80° E., dips 20° to 35° northward, is 2 to 15 feet wide, and contains thin discontinuous quartz stringers ranging from 6 inches to 3 feet in thickness. In most exposures the quartz is fractured, stained red, brown, and black by iron oxides, contains pyrite cubes altered to iron oxide, and shows some green copper stains. A fine-grained, gray aplite (quartz monzonite?) dike is associated with the shear zone. The aplite contains sparse iron sulfides and the dike forms either the hanging wall or footwall in most workings that have explored the shear zone. According to Merrill (1917, (1919), p. 538 the mine explored a vein which contained galena carrying gold.

Development: The Gold Galena mine workings explore the shear zone-aplite dike contact over an east-west distance of half a mile. There are 8 inclined shafts of undetermined extent, numerous shallow pits and cuts, and 2 vertical shafts 50± feet deep. The most extensive workings are in the west part of the area where the largest inclined working is boarded over. Merrill (1917, (1919), p. 537) reported that in 1914 the workings were down from 70 to 100 feet. Although the deeper workings could not be entered in 1957 they apparently have not been much changed since the depths reported by Merrill.

Production: Undetermined (1960).

References: Merrill, 1917 [1919] p. 538; Brown, 1923, p. 99; Tucker and Sampson, 1929, p. 479; Tucker and Sampson, 1945, map, no. 44; Goodwin 1957, p. 603. C.H.G. 6/29/57.

Gold Master Mine

See Black Warrior Mine.

Gold Park Consolidated (?)

Mine No. 1

Location: SE $\frac{1}{4}$ sec. 2, T. 2 S., R. 9 E., S.B.M.,
Twentynine Palms quadrangle, 1955; Pinto Mountains,
Joshua Tree National Monument, about 8.5 miles S. 21°
E. from Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Undetermined.

Geology: Pinto gneiss is cut by numerous thin veins
of hematite-pyrite-gold (?) bearing milky quartz, and
a few pegmatite dikes. The quartz veins are stained
yellow and red from oxidation of the iron minerals
and are strongest along pre-existing faults.

Development: A 50-foot shaft, inclined 80° west,
is sunk on a north-trending quartz vein. (~~About 12~~ ^{out}
~~feet below the surface is a westerly excavated 5-foot~~
~~stop.~~) A trench, (~~ranging in depth from 0 to~~ 2 feet, ^{is}
dug from a point 40 feet east of the shaft to the
collar of the shaft. About 350 feet northeast of the
shaft, and at nearly the same elevation, are 2 adits
accessible through the same portal. One adit is
driven N. 50° W. along a nearly vertical fault, for
a distance of 66 feet, and the other is driven N. 25° W.
for a distance of 54 feet (fig. 1/). ^{It is idle.}

Production: Undetermined.

References: None.

J.R.E. 2/12/59

**Fig. 1/. Geologic sketch map of the Gold Park
Consolidated (?) Mine No. 1.**

Gold Park Consolidated (?)

Mine No. 2

Location: SW $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M.
(proj.), Valley Mountain quadrangle, 1956; Pinto
Mountains, Gold Park, 8.3 miles S. 23° E. from Four
Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Undetermined.

Geology: A nearly vertical fault cuts highly weathered
coarse grained hornblende granite. Criss-crossing gold (?)
quartz veins, as much as 1-foot thick occur in the granite
and are strongest along the fault plane.

Development: An adit is driven S. 60° E. approximately
45 feet along the strike of the fault. Immediately in
front of the portal and centrally located in an open cut
that leads into the adit is a shaft sunk vertically about
35 feet in the fault plane.

Production: Undetermined.

References: None

J.R.E. 2/12/59.

Gold Park Consolidated (?)

Mine No. 3

Location: SW $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, 8.3 miles S. 25° E. from Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Undetermined.

Geology: Numerous thin gold-bearing (?) quartz veins, dense green basic dikes, and aplite dikes as much as 1-foot thick occur in monzonite (?) porphyry and hornblende granite. The highly gradational contact between the two rock types is well exposed about midway along a trench connecting two adits (fig. 1/). Both rock units are highly weathered and undergoing granular disintegration.

Development: Two shafts, about 120 feet apart, are sunk in hornblende granite (fig. 1/). The southernmost one is inclined 75° W. and is sunk to a depth of at least 50 feet. The other shaft is inclined 65° W. and is 12 feet deep. About 170 feet northwest is a shallow, nearly north-trending trench connecting two short adits (fig. 1/). The northernmost adit, a few tens of feet from the road, is driven northwest about 6 feet in monzonite (?) porphyry. The more southerly adit is driven southeast about 12 feet in hornblende granite. The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 2/12/59.

Figure 1/. Sketch map of the Gold Park Consolidated (?) Mine No. 3 (topography from U.S.G.S. 15' Valley Mountain quadrangle, 1956).

Gold Park Consolidated (?)

Mine No. 4

Location: SW $\frac{1}{4}$ sec. 6, T. 2 S., R. 10 E., S.B.M.
(proj.), Valley Mountain quadrangle, 1956; Pinto
Mountains, Gold Park, 9.2 miles S. 33° E. of Four Corners,
Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Undetermined.

Geology: A north-striking and steeply east-dipping
fault cuts the Pinto gneiss. A persistent clayey gouge
zone about 1-foot thick occurs in the fault plane. No
mineralization was observed (fig. 1/).

Development: An open cut leads into the portal of
an adit driven north 140 feet along the strike of the
fault. At 136 feet a winze is sunk vertically about 18
feet in the fault plane (fig. 1/). The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 3/19/59.

Figure 1/. Geologic sketch map of the Gold
Park Consolidated (?) mine No. 4.

Gold Park Consolidated (?)

Mine #5

Location: NE $\frac{1}{4}$ sec. 12, T. 2 S., R. 9 E., S.B.M.
(proj.), (U. S. Geological ^{and} Survey) Valley Mountain quad-
rangle, 1956; Pinto Mountains, Gold Park, 9.4 miles
S. 26° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Undetermined.

Geology: Hornblende granite and White Tank quartz
monzonite intrude the Pinto gneiss along the lower west,
and south flanks of a roughly triangular shaped hill.
The area is much cut by minor faults. Thin gold (?)
bearing veins, and fine-grained green basic dikes transect
all three rock types (fig. 1/).

Development: Three shafts, 4 prospect pits, 2 trenches,
and an open cut constitute the mine workings. A majority
of the work is shallow, but one older shaft is sunk
52° east at least 100 feet (fig. 1/). An arrastra has
been constructed on a flat cleared off area several tens
of feet downslope from this shaft (fig. 2/). It served
as a rude drag-stone mill for pulverizing gold (?) quartz
material. The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 3/20/59.

Fig. 1/. Geologic sketch map of the Gold Park
Consolidated (?) Mine #5 (topography from U.S.G.S. 15'
Valley Mountain quadrangle, 1956).

Fig. 2/. An arrastra, or rude drag-stone mill used for pulverizing gold (?) quartz material. Note the stone "drag" in the extreme right part of the circular rock lined depression.

Gold Point Mine

Location: Sec. 5, T. 3 S., R. 10 E., S.B.M., (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, about 4.5 miles southeast of White Tank adjacent to the Pinto Basin Road (see pl. 2/).

Ownership: William F. Keys, P.O. Box 114, Joshua Tree owns at least one unpatented claim (October 1959).

History: In 1935 the mine was owned and operated on a small scale by Leon M. Campbell, Twenty-nine Palms.

Geology: Medium- to coarse-grained Pinto gneiss, cut by a northwest to west-trending and 60° southwest-dipping fault, is intruded by Gold-Park gabbro-diorite. Thin, highly oxidized quartz stringers in the fault plane contain minor amounts of gold probably. Of interest are two dikes of Gold Park gabbro-diorite at locality D, fig. 1/. The exposure is in a minor cliff face at right angles to the strike of the dikes (fig. 2/). A few hundred feet west of these dikes in an excellent exposure in the same cliff face, a number of irregular bodies of gabbro-diorite have intimately intruded the gneiss.

Development: Three shafts, ranging in depth from about 30 feet to 50 feet, are sunk in Pinto Gneiss in the plane of the fault (fig. 1/). The mine is idle.

Production: In 1935 46 tons of crude ore were processed to recover 23 oz. of gold and 7 oz. of silver (compiled by the U. S. Bureau of Mines (records) and published with (the) permission of the (mine) owner).

References: None.

J.R.E. 10/15/59.

Figure 1/. Sketch map showing the areal distribution (A), and a geologic sketch map (B) of the Gold Point Mine (topography from U.S.A.C.E. 15' Pinkham Well quadrangle, 1943).

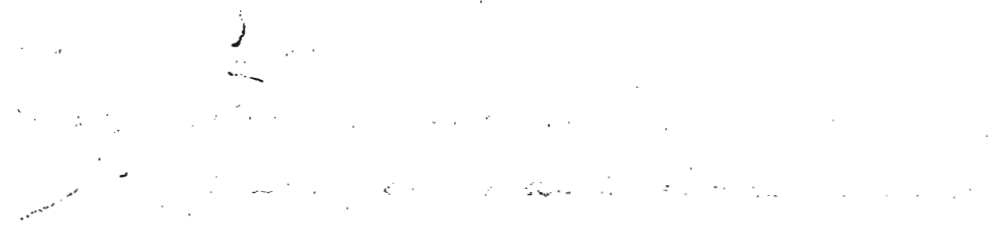


Figure 2/. View southwest into a minor cliff face where two dikes of Gold Park gabbro-diorite cut the Pinto Gneiss (locality D, fig. 1/). The dikes are exposed at right angles to their strike.

#167

Gold Rice Mine

Location: NW¹/₄ NW¹/₄ sec. 12 (proj.), T. 2 S., R. ²/₃₃ E., S.B.M., Vidal quadrangle, 1950; on the west slope of the Riverside Mountains, 7 miles south of Vidal.

Ownership: Undetermined().

History: According to Jack Stewart of Parker, Arizona, this is one of the older gold mines of the district, though it is little more than a prospect.

Geology: The area of the Gold Rice is one of contorted and faulted gneissic rocks which contain a few thin lenses of carbonates. A mineralized zone about 3 feet wide lies along a fault which trends due north and dips 20° W. Minerals identified in the zone are calcite, barite, fluorite, iron oxides, and malachite.

Development: A single adit about 20 feet long has been driven south on the fault.

The road shown on the quadrangle map, was joined by a new road from the south and extended to a point just northeast of the Gold Rice Mine in the process of the recent (1958) development of the nearby Riverside Mountains Manganese Deposit (see herein).

Production: Undetermined.

References: None.

R.B.S. 12/17/57.

Gold Rose Mine

See Brooklyn mine.

Gold Shot Mine

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 28, T. 6 S., R. 4 E., S.B.M., Idyllwild quadrangle, 1959; in Penrod Canyon, 2 $\frac{1}{4}$ miles east of Kenworthy Guard Station, in the San Jacinto Mountains.

Ownership: G. Charles Munz, 11472 College Ave., Garden Grove, holds the Gold Shot and three adjoining claims, the Golden Libra, Big Jim and Triangle (1958).

History: The Gold Shot Mine was located about 1927. It was acquired by Gold Shot Mines Inc. in 1929 and operated for two or three years. With the dissolution of the corporation (date not known), the present owner and a Mr. Gibson assumed ownership. Mr. Gibson died in 1948 leaving Munz the sole owner. Because of the low tenor of the ore the mine has not shown a profitable yield (personal communication, G. C. Munz, June 1948).

Geology: The area of the Gold Shot mine is underlain by granodiorite cut by pegmatite dikes as much as 18 inches in thickness. A fault strikes N. 65° W. across the claim and dips 75° NE. Finely disseminated, free milling gold is reported to be associated with iron oxides in a fractured quartz vein 3 to 4 inches wide which lies in the plane of the fault. The vein averages about \$6 per ton with some "high grade" as high as \$14. It is traceable for about 200 feet. The pegmatites, which consists mainly of quartz with subordinate black tourmaline, feldspar, and mica, are according to Munz, barren of gold. In one of the thicker dikes, a few tens of feet northeast of the mine, the quartz is colored a pale rose.

Development: The gold-bearing quartz vein is explored by a 10-foot vertical shaft, a 100-foot shaft inclined on the dip of the fault, and an 80-foot drift adit. A short drift runs northwest from the inclined shaft at the 50-foot level. The owner is resuming operations. The 10-foot shaft represents progress made on a new inclined shaft being sunk 25 feet southeast of the old one. The latter is abandoned as unsafe. The adit, which is 25 feet northwest of the old shaft, is also abandoned as unsafe. The owner intends to install a small ball mill

and use mercury amalgamation. A lack of water is the chief problem. In addition it was found that, during previous operations, the mineral content of the water coated the amalgamation plates, inhibiting concentration (personal communication, G. C. Munz).

Production: Undetermined.

References: Tucker and Sampson, 1932, p. 5-6, pl. 1; 1945, p. 131, pl. 35.

Gold Standard Mine

Location: SE $\frac{1}{4}$ (?) sec. 9, SW $\frac{1}{4}$ (?) sec. 10, T. 3 S., R. 8 E., S.B.M., Lost Horse Mountain quadrangle, 1958; Joshua Tree National Monument, 4 $\frac{1}{2}$ miles southeast of Ryan Campground on the southwest margin of Lost Horse Mountain.

Ownership: Dr. H. W. Milo, 224 El Camino Real, Vallejo, holds the Gold Standard claim and the Desert Queen Mill site, 6 miles to the northwest in the NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 34, T. 2 S., R. 7 E., S.B.M., at Stubby Spring.

History: The Gold Standard claim was first located by Johnny Lang in 1902. Later the claim was relocated by William F. Keys and subsequently sold to Dr. Milo about 1955. Intermittent development work has been done for many years, but apparently the property never was an operating mine.

Geology: The mine workings explore thin quartz veins in banded quartz-biotite gneiss (Pinto gneiss). At the shaft a quartz vein in sheared gneiss strikes N. 30° W., dips 30° SW. to vertical, and is $\frac{1}{2}$ - to 1-foot thick. The quartz is much stained with yellow and reddish-brown iron oxides and contains large bleached mica plates. Vein quartz, trending about N. 10° W., crops out discontinuously for about 500 feet north of the shaft. This quartz is red to black iron stained and shows sparse green copper coatings. Sulfide mineralization was not observed. In biotite schist 50 feet northeast of the shaft a 2-foot wide quartz vein strikes N. 40° E. and dips 40° SW.

Development: The quartz veins have been explored chiefly by a 40-foot vertical shaft with windlass; by 6 open-cuts, 5-10 feet deep and as much as 25 feet long; and by a number of shallow pits and trenches.

Production: Undetermined.

References: None.

C.H.G. 6/20/57.

Gold Standard Mine

Location: Sec. 1, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about $\frac{1}{2}$ mile south of the Brooklyn mine and about 3 miles southeast of New Dale (Site). See pl. 3/.

Ownership: Berton L. Schwab, 5438 Delta St., San Gabriel, owns 3 unpatented lode claims (March 1958).

History: The first record of mine activity shows a small production in 1939. F. E. Kerby, Twentynine Palms, was the mine owner. In 1956 the mine was again active, and a small production was recorded by the present owner.

Geology: A quartz vein of undetermined thickness and extent is contained in a northwest-trending and steeply-dipping fault which parallels, and is adjacent to a northwest-trending ridge carved in quartz monzonite.

Development: A crosscut adit is driven about 600 feet northeast and into the side of the hill. It ^{joins} (connects) the 200-foot main shaft, which is sunk in the vein higher on the hill slope, at the 160-foot level. The adit was driven in order to transport ore from northwest and southeast drifts of undetermined length on the 160-foot level (Karl Schapel oral communication, 3/8/60).

Production: Compiled by the U. S. Bureau of Mines and
published with permission of the owner.

Year	Crude Ore (tons)	Gold (oz.)	Silver (oz.)
1939	8	4	
1956	15	3	1

References: None.

J.R.E. 3/8/60.

Gold Tiger Mine

See: Black Butte mine.

Golden Bell (Blue Bell) Mine

Location: Sec. 8 (?), T. 3 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, about 4 miles southeast of White Tank, and about $\frac{1}{2}$ mile southwest of the West Pinto Basin Road (see pl. 2/).

Ownership: George W. Dooley, 844 Valley St., Burbank owns 1 unpatented claim. (January 1960).

History: The mine was active from 1934 to 1937 and from 1939-1941. During this period of time (1934 to 1941) it was owned by M. A. Rogers of Twentynine Palms. C. A. Benito, Twentynine Palms, owned the mine from 1954 to 1957. He performed cleanup work in 1954.

Geology: Pinto gneiss is cut by a 80° SW.-dipping and N. 60° W.-trending fault zone as much as 4 feet wide. The zone is exposed for 500 feet and is composed of finely crushed material containing thin but highly oxidized gold-bearing milky quartz veins and stringers (fig. 1/).

Development: The main workings consist of an inclined shaft sunk at least 80 feet in the fault plane and a drift adit extending 435/^{feet} northwest from the shaft collar. The adit has been extensively overhand and underhand stoped.

105 feet from the portal
A winze extends down 20 feet to a second level *of under* *or as it*
terminated extent. A 70-foot shaft sunk in the fault
connects to the main level 170 feet from the portal.

Two minor drift adits are driven in the fault about 80 feet above the main level (see fig. 1/). About 450 feet N. 60° W. from the collar of the main shaft another shaft is sunk at least 75 feet in the fault plane. The collar is close to 120 feet above the main shaft. On the surface the fault trace has been locally trenched and excavated (fig. 1/).

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude ore (tons)	Recoverable Metals	
		Gold (ounces)	Silver (ounces)
1934	117	118	29
1935	36	29	7
1936	100	36	11
1937	5	6	1
1939	60	24	4
1940	3	1	
1941	21	4	
1954	1	1	1

References: None.

J.R.E. 1/25/60.

Golden Bird Claim

Location: NW¹/₄NW¹/₄ sec. 28, T. 1 S., R. 22 E., S.B.M.,
Vidal quadrangle; ¹⁹⁵⁰ on the east side of the most westerly
^
foothill of the West Riverside Mountains, 3 miles south
of Grommet.

Ownership: Undetermined.

History: Undetermined.

Geology: The country rock is strongly jointed, gneissic granite. A poorly exposed shear zone strikes north and dips 50° W. A vein as much as 4 inches wide lies in the plane of the shear. It consists of a central zone of quartz containing grains and bunches of galena and chalcopyrite. The central zone is bounded by layers of quartz and the same sulfides in generally finer grained, discontinuous laminae. The chalcopyrite is largely altered to oxides of iron, chrysocolla and malachite, the fine-grained bounding material having been most completely affected. Assay data were not found for this deposit, but when panned, a small sample showed free gold.

Development: The vein is explored by a single 15-foot, inclined shaft.

Production: Undetermined.

References: None.

R.B.S. 11/17/59

Golden Chariot Mine

See Golden Charlotte.

Golden Charlotte (Golden Chariot) Mine

Location: NE $\frac{1}{4}$ sec. 31, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7 $\frac{1}{2}$ ', 1950; about 6 miles west of Perris. The Golden Chariot Mine is south of and adjacent to the Santa Rosa.

Ownership: Undetermined (1959). ROBERT C. & MARTIN L. HESS (1975)

History: The earliest report of the Golden Chariot Mine (Crawford, 1894, p. 311) includes a photograph (following page 310) which shows the relative positions of the Santa Rosa Mine and the Golden Chariot Mine. The Golden Chariot is in the foreground; the view is to the north. This report (Crawford, 1894, p. 311), though brief, is the most complete, subsequent reports being a series of successively shorter abstracts of it. Charles L. French, Redlands, was then the owner of the mine.

Geology: The Golden Chariot Mine explores a poorly exposed quartz vein which strikes N. 10° W., dips 45° to 55° SW., and was reported to be an extension of the vein explored by the Santa Rosa Mine (Crawford, 1894, p. 311).

Development: According to Crawford (1894, p. 311) the shaft of this mine is 310 feet deep with a single drift of unspecified length near the bottom. The shaft is inclined about 30° at the collar. When inspected in 1950 the mine was flooded to within about 50 feet of the surface. The shaft is timbered and open. Sheathing at the collar is in good condition.

~~Idle~~

Production: Undetermined.

References: Crawford 1894, p. 311; Merrill and Waring, 1917, p. 529; Tucker, 1929, p. 479; Sampson, 1935, p. 509.

R.B.S. 6/15/59

Golden Eagle Mine

Location: Sec. 14 (?), T. 5 S., R. 13 E., S.B.M., U. S. Army Corps of Engineers, 15', Canyon Spring quadrangle 1944; 2 3/8 miles northeast of Hayfield Pumping Station. The mine is on the north slope of a low foothill as the southern margin of the Eagle Mountains. The most southerly workings are visible from the power-line road which extends eastward from the Hayfield plant.

Ownership: Undetermined: Mr. George Mieding, 8015 Klinedale, Pico Rivera, is considering (April, 1961) developing this property in association with several other individuals.

History: Although this property probably was located many years ago, no report of its early history was found. The mine was held in 1941 by W. H. Wolcott, Riverside and was shown on the mines map in the 1945 county report by Tucker and Sampson (pl.35).

Geology: The country rock is granitic. Two en echelon shears are exposed through a distance of about 350 feet from the top of the hill down the north slope to a wash. They range in strike from N. 40° E. to N. 70° E. and dip 45° SE. The planes of both the shears are marked by a quartz vein ranging from 0 to 5 inches in thickness. Fractures and cavities in the quartz are filled with oxides of iron which carry traces of free gold. A sample taken from the mine shaft by George C. Mieding contains chalcopyrite and secondary copper minerals in bunches as much as an inch in diameter.

Development: The veins were worked by means of an inclined shaft, one short ^{Cross} cut adit, 3 short drift adits and two prospect pits. The inclined shaft is at the foot of the slope near the wash (figure ___/). It appears to be about 75 feet long and is on the vein but it is partly caved and unsafe to enter. One of the short drift adits is about 45 feet up the slope and southwest of the shaft. It was driven 10 feet southwest. In a shallow ravine about halfway up the slope the crosscut adit was driven south 45° west in barren granite. It appears to explore the essentially unmineralized zone of overlap between the feathered edges of the two shear planes. The remaining two drift adits are driven into the north and south slopes of the hill near its top. One extends 10 feet northeast, the other 40 feet southwest. They could be connected by 15 or 20 feet of drifting. A stope extends to the surface from the 40 foot adit; an inclined distance of about 40 feet. Only light timber, mainly stulls, was used.

Production: U. S. Bureau of Mines records show that in 1941, one ton of ore yielded one ounce of gold. No other records were found.

References: Tucker and Sampson 1946, pl.35.

R.B.S. 1/20/59

Golden Egg Mine

Location: Sec. 14, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about $4\frac{1}{2}$ miles south-southeast of New Dale (Site) and $1\frac{1}{2}$ miles southeast of the Gold Crown mine (pl. 3/).

Ownership: Karl Schapel, Box 113, Twentynine Palms, owns 2 unpatented lode claims.

History: Originally owed by Jack Meek as long ago as 1940, when a small tonnage of ore was processed. In recent years the mine has been owned and worked by Karl Schapel.

Geology: Quartz monzonite is cut by a N. 10° W-trending and steeply east-dipping fault. The fault zone is locally at least 3 feet wide and contains a strongly oxidized gold-quartz vein ranging in thickness from 6 inches to 2 feet (fig. 1/).

Development: The main shaft is sunk 100 feet in the fault plane, North drifts on the 17-foot, 27-foot, 67-foot, and 88-foot levels join to it. A cross cut adit is driven east 130 feet to intersect the 345 foot drift on the 88-foot level (see fig. 1/).

About 240 feet north of the main shaft a second shaft is sunk 125 feet to the drift on the 88-foot level. There is a small mill on the property, and it is nearly complete and ready to process ore from the mine. Material will be fed through a primary jaw crusher and ball mill to amalgamation plates. The mine is operated by the owner who is presently extending the drift on the 88-foot level.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude Ore (tons)	Gold (oz.)	Silver (oz.)
1940	16	15	3

References: None.

J.R.E. 3/9/60

Figure 1/. Geologic sketch map of the Golden
Egg mine.

Golden Nugget Mine

Location: NW $\frac{1}{4}$ sec. 30, T. 4 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7.5', 1953; about 6 miles west
of Perris and half a mile southwest of the Ida-Leona
Mine.

Ownership: Undetermined (1959).

Geology: A quartz vein of undetermined attitude,
thickness, and extent occurs in diorite near the edge
of a flat.

Development: A single vertical shaft of undetermined
depth appears to be the only development. It is flooded
to within 15 feet of the collar. A head frame and
timbered collar are in fair repair. Idle.

Production: Undetermined.

References: None.

R.B.S. 6/16/59.

Golden Nuggett Lode Claim

Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 34, T. 5 S., R. 10 E., S.B.M., Cottonwood Spring quadrangle, 1958; south margin of the Cottonwood Mountains 2 miles northeast of Cactus City on the east side of Pinkham Wash.

Ownership: Golden Nuggett Mining Co., Otto and Leo Katz, 12180 Sunset Blvd., Los Angeles 49.

History: Located by Otto and Leo Katz in June 1956.

Geology: Irregular thin shear zone in banded quartz biotite gneiss (Pinto gneiss) cut by White Tank quartz monzonite. The shear zone strikes N. 40° W., and dips 35° NE. No vein quartz or other mineralization observed.

Development: Open cut connected to 15-foot drift adit on the shear zone.

Production: Undetermined.

References: None.

C.H.G. 5/15/61.

Golden Rod Mine

Location: Sec. 1, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about 4 miles southeast of New Dale (Site) and 2 miles south of the Brooklyn mine (see pl. 3/).

Ownership: Undetermined.

History: The mine was apparently discovered in the middle 1930's and worked intermittently until 1939 by the O.K. Mining Company, Joseph Ingersoll, president. Tucker and Sampson (1940, p. 49) report the mine was under lease in 1940 to the Pinto Basin Mining Company, Indio. A record of production in 1940, 1941, and 1942 shows the mine was active during this time. In 1951 and 1953 the mine was again active and was owned by the Pinto Basin Mining and Milling Company, 7940 Sunset Blvd., Los Angeles. The property was not in operation the day of the visit.

Geology: A north-striking and 80° W.-dipping quartz vein occurs in quartz monzonite and ranges in thickness from 2 to 4 feet (Tucker and Sampson, 1940, p. 49).

Development: A shaft is sunk 350 feet on the vein, North and south drifts extend from the shaft on the 40, 80, 130, 200, 250, and 350-foot levels to develop an ore shoot 75 to 100 feet in length and 4 feet in average thickness. In 1940 there was a small mill (10 tons capacity) on the property, but the ore was hauled to the Gold Crown mine mill for treatment (Tucker and Sampson, 1940, p. 49). As water had to be hauled from Mission and Sunrise Wells $3\frac{1}{2}$ miles to the southwest, it was probably more convenient to haul the ore to another mill than to process it on the property.

Production: From 1935 to 1953, sporadic mining of the Golden Rod mine yielded roughly 2,200 tons of ore averaging about 0.5 of an ounce of gold and 0.1 ^{of} (for) an ounce of silver per ton.

References: Tucker and Sampson, 1940, pp. 49-50;
Tucker and Sampson, 1945, p. 132.
J.R.E. 3/8/60

Golden Rule Group of Claims

Location: Reported to be in sec. 30, T. 2 S., R. 10 E., S.B.M. (proj.), south of Twentynine Palms, in the Pinto Mountains by Tucker and Sampson (1929, p. 480). Not confirmed, and all the information below is from the previously mentioned reference.

Ownership: Undetermined.

History: In 1929 the mine was active and the 2 claims were owned by Dr. Francis Coltrin, E. C. Miles, and John Stull, Fullerton.

Geology: A vein striking N. 30° W. and dipping 80° W. occurs in gneissoid granite. It ranges in width from 1 to 2 feet. A diorite dike occurs along the footwall.

Development: A shaft is sunk 75 feet on the vein. At the 50-foot level there is a drift 35 feet south.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 480.

Good Hope Mine

This report is based largely on information contained in a recently published description by Engel, Gay and Rogers (1959, p. 63-67).

Location: NW $\frac{1}{4}$ sec. 15, T. 5 S., R. 4 W., S.B.M., and part of a claim extending northeast into section 10, U. S. Army Corps of Engineers, Elsinore quadrangle, 15', 1942; about 5 miles northeast of Elsinore on the northwest side and about 200 feet northwest of Highway 74. Patented claims include 160 acres (Engel and others, 1959, p. 63).

Ownership: Dr. Berto Olson, 2508 Ocean, Corona Del Mar.

History: The Good Hope mine was the most productive gold mine in Riverside County. Between the years 1875 and 1941 it yielded a reported 17,759 ounces of gold and 3,552 ounces of silver. The history of the Good Hope mine began about 1874 when Mexican placer miners and a Frenchman named Mache first located the Good Hope vein zone. It apparently had been the original source of much of the placer gold mined for years prior to 1874 in the arroyo east of the mine. The Good hope vein zone was found as a "blind lead" through systematic prospecting at the upstream limit of gold-bearing gravel. The vein was opened in numerous places along its course and the

About 1923, Mrs. Velna L. Teater acquired the property but it remained inactive until about 1932 when the mine was leased and reopened by Good Hope Development Company. A 20-ton capacity mill used amalgamation, leaching, and flotation methods to treat both the dump and new ore. Financial difficulties and mine safety regulations caused the closing of the mine in 1936.

The Panamint Mining Company leased the property from 1947 to 1953. In 1959 it was reported (Engel, p. 67) that no operative machinery remained, and all workings below about 50 feet were flooded and presumably largely caved. By 1962 Dr. Olson had acquired the property and had leased it to a group of investors who planned to build a mill for the treatment of dump material and ore from new underground work.

Geology: The Good Hope mine is in an area underlain by deeply weathered granitic rocks. In the mined area the country rock is strongly chloritized and kaolinized. Mineralized zones are delimited by seams of gouge, talcose materials, and clay. Felsitic dikes and porphyritic basic dikes, from a few feet to as much as 30 feet wide are traceable on the surface in the vicinity of the mine. One east-trending basic dike appears to mark the northern limit of gold deposition.

References: Goodyear, 1888, p. 527; 1890, p. 151;
Storms, 1893, p. 106; Crawford, 1894, p. 221; 1896, p. 311;
Merrill and Waring, 1919, p. 532-533; Sampson, 1935, p. 509-
511, Engel and others, 1959, p. 63-67.
R.B.S., from Engel and others.

Granddaddy Mine

Location: NE $\frac{1}{4}$ sec. 5 (proj.), T. 8 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; about 1,000 feet northeast of peak 1195, in the Mule Mountains, and about 13 miles by road west of Ripley. The Granddaddy Mine is accessible by a quarter of a mile of narrow foot trail which extends southwest from the nearby Grubstake Mine.

Ownership: Carlo M. Micalizio, 529 N. Broadway, Blythe (1958).

History: Undetermined.

Geology: The country rock is gneissic granite. A fault, which strikes N. 40° W. and dips 85° NE. crosses the claim. A mafic dike as much as 3 feet wide, and a quartz vein, lie in the fault zone. The dike is the footwall of the vein and both the dike and the quartz vein are complexly fractured. The vein is exposed for about 100 feet and is as much as 3 feet in width. It resembles the vein at the Hodges Mine a quarter of a mile to the east and probably is a part of the same vein system.

fill
Hematite and chlorite ~~were the principal~~
~~minerals observed in~~ fissures and vugs in the vein.

Development: The vein has been explored by shallow
trenches along the full length of its outcrop. ~~Ida.~~

Production: Undetermined.

References: None.

R.B.S. 4/8/58.

- 4/8/58 -

Granite Mine

Location: NW $\frac{1}{4}$ sec. 4 (proj.), T. 6 S., R. 15 E., S.B.M., U. S. Army Corps of Engineers Chuckwalla Mountains quadrangle, 15', 1945; about 3 miles southwest of Desert Center.

Ownership: Henry K. Hennigh, Box 468, Desert Center (1959).

History: According to the present owner, the Granite mine was located in 1860 by two men, named Hurst and Smith, who started to work the deposit in 1894. A 10-stamp mill was built and operated for an undetermined period. In 1917 the mine was reported to have changed hands several times. It was held, at that time, by Silas Marsters, Riverside (Merrill and Waring, 1917, p. 540). In 1920 the Granite mine was owned and operated by Chuckawalla Mining and Milling Company. In 1929 (Tucker and Sampson, p. 480) it was still in the same hands but idle. A 10-ton Harding ball mill was installed in 1930 when the mine was reopened with financial support from a Mr. Osborn, Pasadena, and the present owner. Capacity was increased, in 1932, by use of a 24-ton Denver ball mill. The gold was recovered by amalgamation, table, and cyanide. Operations were terminated in 1932 because of the low grade of the ore. H. K. Hennigh has retained ownership to the present time and is currently doing exploration. (Personal communication, H. K. Hennigh).

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Geology: A mineralized fault strikes N. 10° - 20° W. along a low granite ridge and dips 40° - 55° SW. It is exposed in the mine for a strike distance of about 350 feet and to a maximum depth of 100 feet. Through the northern half of this exposure the fault branches. The two principal breaks thus formed are roughly 55 feet apart where exposed in the north end of the workings. Here, in addition, the country rock is cut by basic dikes as much as 3 feet in thickness. Both the dikes and veins along the faults have been disturbed since their emplacement. The fault zone is cut off at the south end of the workings by another fault.

The ore consists of fractured vein quartz carrying oxides of iron as stains and smears and as pseudomorphs after pyrite. Fine, free-milling gold occurs in the iron oxides. Manganese oxide dendrites are common in fractures and there are scattered stains of copper minerals. Silver is reported as a product of the mine but its ore mineral was not identified. Some part of the mine have yielded radioactivity measurements as high as ten times background and samples analyzed by the U. S. Geological Survey laboratories contained thorium and were graded (percent) at 0.45eU, 0.034 U (Walker and others, 1956, p. 12, 37). The quartz veins range from 0 to 3 feet in thickness.

Development: The old 1894 discovery shaft, at the south end of the workings was sunk 100 feet on and near the fault. At the 50-foot level a 130-foot drift was driven northwest and a 40-foot drift southeast to a short crosscut. There are several stopes near the shaft. Crosscuts extend 70 feet southwest and 70 feet northwest from the bottom of the shaft. The north workings comprise a 330-foot crosscut adit. A drift extends roughly 300 feet southwest on a level 30 feet down the dip of the fault from the 50-foot level of the south shaft with which level it is connected by two raises. An additional 100 feet of drifts explores a branch of the fault in the north workings. Ore bodies ^{much as on} ~~up to~~ a foot thick were stoped in a 10 foot-wide shear zone north and south of the junction of the faults.

When visited (March, 1959) activity was centered in the exploration of a narrow northwest-trending vein exposed on the east slope of the ridge 200 to 300 feet southeast of the crosscut adit. A 30-foot shaft had been sunk on the vein. A gently inclined shaft, being driven west from a point 50 to 75 feet lower on the slope to crosscut the vein was about 40 feet long and had not reached the vein.

Production: The yield of the Granite mine was not determined. The owner stated that the ore runs about \$10 per ton in gold and \$6 in silver.

References: Merrill and Waring, 1917, p. 540; Tucker and Sampson, 1929, p. 480; 1945, p. 133-134; Walker and Others, 1956, p. 12, 37.

R.B.S. 3/9/59.

Gray Mine

See: Lam Gray Mine.

Great Western Claim

See Red Cloud Group.

Development: Tucker and Sampson (1945, p. 137) reported a 75-foot shaft and a 150-foot adit on the vein, and a 5-stamp mill on the property. In June 1957 the shaft was not found, the adit on the west side of the canyon was about 50 feet long, and no trace of the mill remained.

Production: U. S. Bureau of Mines records show 2 tons of crude ore produced in 1937 yielded 2 ounces of gold and 1 ounce of silver.

References: Tucker and Sampson, 1945, p. 137.
C.H.G. 6/29/57.

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Grubstake Mine

Location: NE $\frac{1}{4}$ sec. 5 (proj.), T. 8 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; in the Mule Mountains about 13 miles, by road, west of Ripley.

Ownership: Carlo M. Micalizio, 529 N. Broadway, Blythe (1958).

History: Undetermined.

Geology: The country rock is gneissic granite. In the mine area a fault is exposed for about 100 feet. It strikes N. 70° W. and dips 35° SW. The fault is marked by a zone of gouge 3 to 4 feet thick which includes a shattered and contorted quartz vein as much as 1 foot in thickness. The vein contains seams and pockets of hematite. According to the present owner this material yields \$49.00 per ton in gold.

A zone of contorted gneissic rocks as much as 5 feet wide crops out about 500 feet northwest of the mine. This zone contains crushed lenses and thin veins of quartz associated with calcite, chrysocolla, chlorite, and hematite. It strikes N. 60° E., and dips 35° SE. This fault zone apparently is unrelated to the one at the mine.

Hodges Mine

Location: W $\frac{1}{2}$ sec. 4 (proj.), T. 8 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; on the east slope of the Mule Mountains about 8 miles west of Ripley.

Ownership: Undetermined (1958).

History: This mine was formerly operated early in the present century by Hodge Bros., who had a 3-stamp mill at Palo Verde. It was taken over at an unreported date by Mr. Ludden of Pomona, who added 2 stamps and moved the mill to the mine. Water was pumped from a well in the valley 3 $\frac{1}{2}$ miles away. Operations continued until 1913 (Tucker and Sampson, 1929, p. 481.) Idle.

Geology: The rocks at the Hodges mine are gneissic granite cut by quartz veins. The veins form a generally west-trending system but a few strike from N. 70° W. to N. 70° E. Dips range from 60° southward, through vertical to 60° northward. Most of the veins have exposed lengths ranging from 50 to 100 feet and are of irregular thickness, rarely exceeding one foot. The veins are fractured and largely recemented with iron oxides which appear to have been derived from the alteration of sulfides. Free-milling gold occurs in fissures or is finely disseminated in ^{the cracks} limonite.

Development: The workings are in a narrow canyon and on a steep ridge immediately to the northwest of the old camp site. Development consists of 3 vertical shafts and 3 adits which are apparently joined by an undetermined amount of drifting and stoping. A depth of a least 100 feet was attained at the adit levels. Mining seems to have been systematic, as evidenced by a long haulage adit driven north from the floor of the canyon through barren rock, to facilitate drifting and stoping on the veins in the ridge. Little timber was used except a^s stulls in the stopes. No equipment remains on the property, but the walls of a 3-room stone house are still standing near the mouth of the canyon. When visited (Feb., 1958) the mine was open and dry. Access was good.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 481.

R.B.S. 2/21/58.

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Development: The main workings consist of 2 inclined shafts about 100 feet apart and 40 feet deep driven on the dip of the fault. The shear zone to the northwest was opened by a trench and a 15-foot adit -- Mr. Micalizio states that this work was done at some unknown time before he acquired the property and shows little to warrant further work.

Production: Undetermined.

References: None.

R.B.S. 4/8/58.

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Hansen (Hensen) mine (Hensen Well)

Location: NW $\frac{1}{4}$ sec. 26, T. 3 S., R. 8 E., S.B.M., Lost Horse Mountain quadrangle, 1958; Joshua Tree National Monument, about 1 $\frac{1}{2}$ miles southwest of Pinyon Well, north slope of the Little San Bernardino Mountains.

Ownership: William F. and Frances M. Keys, Box 114, Joshua Tree hold the pinyon group of claims (White Hills, Mountain View, Pinyon, Grand View) in sec. 26. Mr. Keys reports (oral communication January 1960) that the "Hansen shaft" is on the Grand View claim.

History: The early history of the Hansen mine is unknown, but it may have been part of the Pinyon (Tingman-Holland) mine about half a mile to the southeast. The nearby Hensen Well was an important source of water to early-day miners. According to Brown (1923, p. 273) "The well is in a little flat in a very narrow canyon and is high up near the summit of the Little San Bernardino Mountains. Near it (in 1918) are the ruins of an old arrastre and the remains of one or two small stone buildings. ---the water was siphoned to the Eldorado mine with that of Pinyon Well." In 1960 the exact site of the well was not found, but a largely caved vertical shaft and foundations for several buildings, one of which apparently was once a mill, were noted in the NW $\frac{1}{4}$ sec. 26.

Geology: The NW $\frac{1}{4}$ of sec. 26 is underlain by light gray to buff coarse-grained quartz monzonite (White Tank quartz monzonite). The "Hansen shaft" explores thin quartz stringers in a shear zone which strikes N. 55° W., is vertical, and exposed at the surface for a strike length of about 1,000 feet. A second quartz vein crops out about 1,500 feet to the east. This vein strikes about N. 50° W., is vertical or dips steeply southwest, is 2 to 3 feet wide, and exposed at the surface for about 750 feet. Along the same strike, about 600 feet to the southeast, vein quartz again crops out. Here the vein area is as much as 16 feet wide, is exposed for about 600 feet, strikes N. 50° W., and dips steeply southwest.

Development: In the NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 26 a vertical shaft ("Hansen shaft") is sunk on quartz stringers in a shear zone. The workings are inaccessible but the size of the dump suggests at least 100 feet of workings. To the east in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 26 the second quartz vein is explored by several short adits.

Production: Undetermined.

References: Brown, 1923, p. 273.

C.H.G., 1/26/60.

Happy Jack Group

Location: Sec. 31 (proj.), T. ⁶~~5~~ S., R. ⁶~~15~~ E., S.B.M.,
U. S. Army Corps of Engineers Chuckwalla Mountains quad-
rangle, 15'; 1945; about 1½ miles southwest of Corn
Spring and 7 miles southeast of Desert Center.

Ownership: ⁽¹¹⁾Not determined (1959).

History: These claims were operated in the years
1896 to 1898 by the Happy Jack and Chuckwalla mining
companies (Merrill and Waring, 191⁷~~9~~, p. 540).

Geology: A quartz vein as much as 3 feet wide is
exposed for about 300 feet down the north side of a
low granite ridge and for 200 feet on a rise to the north
across a narrow ravine. The vein lies along a shear
zone which strikes N. 30° E. and dips 45° NW.

The vein quartz carries pockets and stains of
iron oxides. Pyrite is present but uncommon.

Development: On the ridge south of the wash the vein is explored by 2 inclined shafts, 50 and 100 feet deep, and a drift adit driven southwest about 125 feet. The 50-foot shaft is about 20 feet northeast of the adit portal. The 100-foot shaft is 100 feet southwest of the adit portal, and connects to the adit at the 30 to 40 foot level. Between the shaft and portal the vein is stoped through a distance of about 30 feet, ~~at a point near the shaft,~~ and up the vein about 20 feet. A 15-foot winze lies below the stop. The adit extends about 25 feet beyond the 100-foot shaft. Though partially caved, it probably connects with a raise to the surface. The workings below the adit level were not examined.

On the rise north of the ravine two inclined shafts, 80 feet apart, one 50 feet deep and the other of undetermined depth, are sunk on the vein and join with an undetermined amount of level workings. About 100 feet south of the shafts a 12-foot inclined shaft is sunk on a shear which strikes N. 10° E. and dips 40° NW. From the bottom of the shaft a drift extends 50 feet to the northeast on a vein 1 - 2 feet in thickness.

According to Merrill and Waring (191⁷, p. 540) development on these claims reached a depth of 300 feet.

Production: Undetermined.

References: Merrill and Waring, 1919⁷, p. 540; Tucker
and Sampson, 1929, p. 481.

R.B.S. 3/13/59.

Helicross Mine

Location: SE $\frac{1}{4}$ sec. 3 (?), T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, Dale District, 8 miles south of Dale Lake, half a mile east of San Bernardino Wash.

Ownership: Undetermined.

History: Undetermined, probably active during the 1930's. Idle.

Geology: Shear zones containing quartz stringers in massive quartz monzonite (fig. ___). Shears strike west to N. 20° W., dip 70° SW. to vertical. At the east working the vein quartz is stained yellow brown to red brown by iron oxide and contains a few fresh pyrite cubes and some pyrite cubes altered to iron oxide.

Development: Two areas have been explored. The west group of workings lies adjacent to the valley in low hills and consists of a 30-foot shaft inclined 80° SW., a 25-foot vertical shaft at the end of a 20-foot open-cut which joins a 110-foot adit, and a 60-foot adit driven east from a 35-foot open cut (fig. ___). The second area lies half a mile to the northeast and 600 feet above. Here an adit of undetermined length is driven N. 20° W. The size of the dump suggests several hundred feet of workings. A truck-loading bunker remains below the adit.

Production: Undetermined.

References: None.

C.H.G. 5/16/61.

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HEMET BELLE MINE

Location: E½ SE ¼ sec. 29, T. 6 S., R. 4 E., S.B.N., Idyllwild quadrangle, 1959; 2 miles east of Kenworthy Guard Station, in the San Jacinto Mountains.

Ownership: D. C. Mayne, 25889 Columbia Street, Hemet (1963).

History: The Hemet Belle is one of the old mines of the area. In 1917 one E. E. Chilson of Kenworthy (a town which no longer exists) was reported to have been working this mine. It was equipped with a 5-stamp mill (Merrill and Waring, 1917, p. 535). In 1929 the Hemet Belle was reported idle and listed as a part of the Chilson Estate (Tucker and Sampson, 1929, p. 481). It was relocated by the present owner in 1951.

Geology: The New Hemet Belle mine explores a gold-bearing quartz vein in the plane of a fault which is traceable for about 500 feet up a ridge on the east side of Hemet Valley. The fault strikes N. 55° E. and is vertical. The quartz vein is as much as a foot wide. Iron oxides fill vugs and fractures in the quartz. According to Merrill and Waring (1917, p. 535) the ore yielded \$15.00 to \$20.00 per ton in gold with some pockets of richer ore.

Development: The workings consist of a 300-foot adit, a 100-foot vertical shaft and several prospect pits. The adit enters the ridge in barren rock on a bearing of N. 50° E. At 100 feet it turns right, goes

20 feet to the vein, turns left and follows the vein for 200 feet to the bottom of the shaft.

The present owner completed a new road to the mine in 1963. All the old workings have been opened and made accessible. A new haulage and prospect tunnel 200 feet long has been driven 200 feet below the old adit.

(Written communication D. C. Mayne, 1963).

Production: Undetermined.

References: Merrill and Waring, 1917, p. 535; Tucker and Sampson, 1929, p. 481; written communication, D.C. Mayne, 1963. R.B.S. 6/24/58.

Hansen Mine

See: Hansen mine.

Hensen Well

See: Hansen mine.

Hexahedron (Hexie) Mine

Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 3 S., R. 9 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree National
Monument, at the south crest of the Hexie Mountains, 4
miles east of Squaw Tank.

Ownership: Undetermined (1960).

History: The Hexahedron Mine was under development as
early as 1894 when Ed. Holland and A. G. Tingman, Indio,
were the owners (Crawford, 1894, p. 223). Development
work and prospecting in the area continued through 1896
(Crawford, 1896, p. 311). The mine was still active in
1914 (Merrill, 1917 (1919) p. 536) and was owned by the
Indio Mining and Milling Company, but by 1918 was in-
active and the mill had been dismantled (Tucker and
Sampson, 1929, p. 481). No written description of the
mill was found, but tailing debris and old foundations in
the NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 14, T. 3 S., R. 9 E., S.B.M. mark a former
mill site. The Hexie mill is said to have been a 5-
stamp mill and the largest in the area. In 1960 the
road to the mine from Pleasant Valley was impassable and
the workings appeared long inactive.

Geology: Banded quartz-biotite gneiss (Pinto gneiss) underlies the mine area. The mine workings explore an altered felsite dike which strikes N. 35° W., dips 40° NE., and is 10 feet wide at the surface. The dike contains thin quartz stringers, local concentrations of pyrite cubes thoroughly altered to iron oxide, and much red to red-brown iron oxide. Dark green mafic dikes, thoroughly weathered, cut the felsite and gneiss irregularly. Crawford (1894, p. 223) described the ore shoot as 75 feet long, 15 to 20 feet in thickness, and dipping 45° N.

Development: The principal working is a 300-foot drift adit driven S. 35° E. with one 30-foot crosscut at 210 feet driven S. 40° W. Above the adit level are 3 open cuts, each about 50 feet long and 30 feet deep. Many shallow prospect pits have been opened in the area.

Production: U. S. Bureau of Mines records list placer production from the Hexahedron of 116.68 ounces of gold in 1893 by H. E. Fallant, Indio.

References: Crawford, 1894, p. 223; Crawford, 1896, p. 311; Merrill, 1917 (1919) p. 536; Tucker and Sampson, 1929, p. 481; Tucker and Sampson, 1945, p. 135.
C.H.G. 1/29/60.

CALIFORNIA DIVISION OF MINES AND GEOLOGY
Preliminary Manuscript

SUBJECT TO REVISION

Hexie Mine

See: Hexahedron mine.

Hidden (Enspiration, Lost Mine Parallel) Mine

Location: SW $\frac{1}{4}$ sec. 7, T. 3 S., R. 8 E., S.B.M., SE $\frac{1}{4}$ sec. 12(?), T. 3 S., R. 7 E., S.B.M., Lost Horse Mountain quadrangle, 1958; Joshua Tree National Monument, on the south face of the Little San Bernardino Mountains, 3/4 mile southwest of Keys (Salton) View.

Ownership: John and Margaret Samuelson, 656 Staple Street, Compton (1936). Undetermined (1960).

History: This property is said to have been discovered by the Sellers brothers who used the name Lost Mine Parallel. During the 1930's William F. Keys operated the mine. Ore was packed by mules up the steep face of the Little San Bernardino Mountains to Keys (Salton) View above. From there the ore was trucked to Keys Ranch, where it was milled in a 2-stamp mill (Oral communication W. F. Keys, 1960). Long idle.

Geology: The mine area is underlain by resistant, fine- to medium-grained, granite (assigned to the Fargo Granite by Babcock, 1961, p. 37 and pl. 1). The irregularly shaped granite mass is surrounded by a halo of altered rock which Babcock (1961, p. 39 and pl. 1) mapped as granitized metadiorite. Both the granite and metadiorite are cut by mineralized faults which strike N. 15°-20° W., and dip steeply east. The mineralized areas are marked by iron gossan and the narrow veins contain pyrite, chalcopyrite, quartz, magnetite, and presumably gold. The mine workings chiefly explore two northwest-trending faults, about a quarter of a mile apart. The west fault, which dips about 60° E., has been prospected along its strike for about 500 feet, and the east fault for about 300 feet.

Development: Numerous prospect pits, shallow shafts, and short adits of undetermined extent.

Production: Undetermined.

References: Babcock, 1961, p. 37-40, 74, pl. 1.

C.H.G. 6/21/57.

Hidden Treasure (American Flag Mine) Claims

Location: E $\frac{1}{2}$ sec. 13 (proj.), T. 8 S., R. 20 E., W $\frac{1}{2}$ sec. 18, T. 8 S., R. 21 E. ^{S.E. 1/4} Palo Verde Mountains quadrangle, 1953; on the east slope of the Mule Mountains, 13 miles west of Ripley.

Ownership: Ned Hyduke, Star Route, Palo Verde.

History: This property was worked in 1910 under the ownership of Frank Steunchfield, Palo Verde. It was then named the American Flag Mine. In 1917 a list of properties known to be located in the area included the name American Flag M. and M. Co., owned by C. A. Ludden, Pomona but no details were given (Merrill and Waring, 1917, p. 541). The literature contains no subsequent report on this mine. A mine called the American Flag was shown by Tucker and Sampson (1945) on their plate 35, but it appears to be mislocated.

Geology: These claims are in an area of low hills formed in foliated gneissic rock of northerly structural trend. A shear zone is exposed through a distance of about 1,000 feet on the east slope of a ridge. It strikes N. 10° W., dips 30° SW., and is as much as 3 feet wide. A fractured quartz vein ranging from 0 to 6 inches in thickness lies along the foot wall. The vein quartz contains seams and bunches of iron oxides with lesser proportions of calcite, specular hematite, chlorite, sericite, pyrite, and traces of secondary copper minerals. Free-milling gold is unevenly dispersed through the above gangue minerals with a probable concentration in the iron oxides.

Development: When visited (January 1960) activity centered at the old shaft which was about 100 feet deep on the dip of the vein. Debris had not been cleared from the bottom of the shaft but some ore had been removed from near the collar. A drift adit was being driven northwest from the end of the ridge about 100 feet south of the shaft. It had been carried about 60 feet along the shear zone and should reach the shaft in another 30 to 40 feet. This will afford access to the shaft at about the 50 foot level (fig. ___/). Northwest of the shaft the vein is exposed in 5 shallow prospects through a horizontal distance of about 170 feet.

Similar veins in the immediate vicinity have been sampled but as yet have remained undeveloped.

Production: According to U. S. Bureau of Mines records, in 1910 the mine yielded 40 tons of ore from which 18 ounces of gold and 11 ounces of silver were recovered. Though the current work is mainly developmental the owner hopes to install a small mill on his ranch near Palo Verde in anticipation of future production.

References: Merrill and Waring, 1917, p. 541;
Tucker and Sampson, 1945, pl. 35 (mislocated).
R.B.S. 1/18/60.

Hillside Group

See Brown Mine.

Hoag Mine

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 24 (proj.), T. 4 S., R. 5 W., S.B.M., Steele Peak quadrangle, 7.5', 1953; about 7 miles west of Perris and roughly 1,000 feet east of Hartford Springs.

Ownership: Undetermined (1959).

History: The first report on the Hoag Mine was by R. J. Sampson in 1935 (p. 512). According to Sampson this property was worked by an unnamed operator from 1884 to 1886, again starting in January 1932, by H. M. Harford, Perris, and that at the time of his report (1935), the mine was flooded and the dumps were being worked.

Geology: Like the neighboring Washington Mine, the Hoag Mine is in an area of low hills and ridges composed of deeply weathered diorite. The vein explored by the mine is poorly exposed. According to Tucker and Sampson, 1945 (p. 135) it strikes northwest and dips 40° SW. ^{They} ~~he~~ states, in addition, that the ore occurs in lenses ranging from a few inches to 2½ feet in thickness and is of limited extent both on the strike and dip.

Development: The Hoag Mine was entered through three vertical shafts and one inclined shaft. When visited in 1959 all four openings were either caved or caving and were unsafe to enter. The maximum depth attained in the workings was 300 feet and roughly 400 feet of drifts were driven at various levels (Sampson, 1935, p. 512). The shafts are arranged in a rough diamond about 270 feet in its longest dimension. This suggests that part of the subsurface work must consist of exploratory cross cuts.

Production: U. S. Bureau of Mines records show that from 1934 to 1937, 3,657 tons of ore yielded 231.79 ounces of gold and 110 ounces of silver.

References: Sampson 1935, p. 512; Tucker and Sampson, 1945, p. 135.

R.B.S. 6/16/59.

Hornet Group

Location: SW $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M.
(proj.), Valley Mountain quadrangle, 1956; Pinto Mountains,
Gold Park, about 8.5 miles S. 22, E. from Four Corners,
Twentynine Palms (see pl. 1).

Ownership: Undetermined.

History: I. N. Lish and B. E. Lish, 8465 Cottonwood,
Fontan^a, located the Hornet Group in May 1956.

Geology: A low elongate south trending-ridge is
carved in the Pinto gneiss. Along the crest of this
ridge the gneiss is intruded by: fine to medium grained
hornblende granite, thin veins of gold (?) bearing milky
quartz, and narrow green basic dikes.

Development: Several pits, trenches and bulldozer
scrapes have exposed the veins and dikes along the
ridge crest over a distance of 0.2 of a mile (fig. 1).

Near the Gold Park road there is a 20-foot trench dug
to join a vertical shaft sunk 12 feet in a fault
(fig. 1). At the bottom of the shaft a drift is driven
15 feet south. The claims are apparently not being worked.

Production: Undetermined.

References: None.

J.R.E. 2/12/59.

Figure 1. Sketch map of the Hornet group (topo-
graphy from U. S. G. S. 15' Valley Mountain quadrangle, 1956).

Gavilan Mine

Location: SE $\frac{1}{4}$ sec. 19 (proj.), T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7.5', 1953; about 6 miles west of Perris.

Ownership: Mrs. Orva Nelson, Hillcrest Road, Perris.

History: The Gavilan is an old mine. It was reported (Merrill and Waring, 1919, p. 528) to have been worked by Mexicans, probably during the early or middle Eighteen hundreds. There followed a period of operation under American ownership. When, in the late Eighteen hundreds, the Gavilan Mine became the property of the San Jacinto Estate, Ltd., of London, it had been idle for many years. Between 1890 and 1892 it was operated, under lease, by an American company. By 1917 the mine was again idle, the machinery having been sold. When visited in 1959 the property appeared long idle.

Geology: A quartz vein, which appears to lie along a fault, is exposed, for about 50 feet on the northwest side of a low outcrop of diorite. The vein strikes N. 70° W., dips about 50° SW., and is 1 to 2 feet wide. Free-milling gold occurs with iron oxides in fractures and cavities in the vein. The vein in the nearby Ida-Leona mine (see herein) was reported to carry, in addition, pyrite and galena (Tucker and Sampson, 1945, p. 136). It is probable that the same minerals are present at depth in the Gavilan mine.

Development: The mine is caved and inaccessible. It was reported (Tucker and Sampson, 1945, p. 135) to have been entered through a shaft 485 feet deep on the vein. The size of the dump suggests extensive development.

Production: Undetermined.

References: Goodyear 1888, p. 527; Storms 1893, p. 366-367; Crawford 1894, p. 221; 1896, p. 311; Merrill, and Waring, 1910, p. 528; Sampson 1935, p. 508; Tucker and Sampson, 1945, p. 135-136; Larsen, 1948, p. 310.
R.B.S. 6/15/59.

=504-
C. J. Pavilion

Ida-Leona Mine

Location: NE $\frac{1}{4}$ sec. 30, T. 4 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7.5', 1953; about 6 miles west
of Perris.

Ownership: Mrs. Orva Nelson, Perris.

History: Formerly the Ida-Leona was described with
the older Gavilan mine (Tucker and Sampson, 1945, p. 135-
136) which is about 400 feet north of it. The Ida-
Leona was most active during the thirties. It was
closed in 1942 because of the gold closing order L-208
and has since remained idle.

Geology: The country rock is quartz diorite. A
quartz vein ranging from 1 to 4 feet in width strikes
N. 65° W., and dips 60° SW. It is exposed for about
250 feet. Free-milling gold is associated with iron
oxides, pyrite, and galena in small pockets and fissure
fillings in the quartz.

3
Development: When visited in 1959 ~~three inclined~~
which were spaced 100, 150 and 250 feet apart through a vertical shaft
shafts were found. They were caved and their extent was
not determined. In 1945 the workings were reported
(Tucker and Sampson, 1945, p. 135-136) to consist of a 2-
compartment shaft 350 feet deep with drifts of unspecified
extent at the 100, 150, 250, and 300 foot levels. This shaft
was probably the most southeasterly one observed by the writer.
The other two openings may have been raises, ventilation shafts,
or exploratory shafts.

- END -

Production: A reported (Tucker and Sampson, 1945, p. 136) \$50,000 in gold was won from an unstated tonnage of ore said to run \$25 to \$50 per ton. Although some high-grade ore was reported, in 1945, to have been shipped to U. S. Smelting Company, Salt Lake City, Utah, the bulk of the ore was milled at the mine.

References: Sampson 1935, p. 508-509; Tucker and Sampson, 1945, p. 135-136; Larsen, 1948, p. 130.

R.B.S. 6/15/59

CO-1
Indian Queen

See Indian Rose Quartz Queen.

Indian Rose Quartz Queen (Indian Queen) Mine

Location: NW¹ sec. 32, T. 4 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7.5', 1953; about 6 miles west
of Perris (see map).

Ownership: Frank Koehn, Rt. 2, Box 94, Perris.

History: The old Indian Queen was reported as a new prospect in 1896. Equipment consisted of a small steam hoist, a 5-stamp mill and a 4" cornish pump. The owner was J. B. Dennis, Perris (Crawford, 1896, p. 311). By 1899 the mine appears to have changed hands, and was reported as "--developed into a promising property by Mr. Anderson." (Mining and Scientific Press, 1899, vol. 79, p. 750). U. S. Bureau of Mines records show that for the year 1899 the mine was operated by Indian Queen mining Co., Perris and for the years 1900 and 1901 production was credited to Anderson and Morris, Perris. In 1917 the property was held by a party named Morrison, Goldfield, Nev. (Merrill and Waring, 1917, p. 531). Save for assessment work, the mine appears to have been inactive since 1917.

Geology: The country rock is weathered diorite. The mine is in poor repair (1959) and the features described in former reports could not be confirmed. The vein was reported to strike northwest and dip 70° SW. (Merrill and Waring, 1917, p. 531). This vein is at the west end of the claim. A second vein is exposed in workings near the north side of the claim. It strikes west, dips 50° S. and consists of broken and pulverized quartz lying in the plane of a shear zone little more than an inch wide where exposed. The quartz is stained and pocketed with iron oxides.

Development: The old workings, which appear to have comprised three shafts, are now caved. They were reported to have been 65 feet deep (Merrill and Waring, 1917, p. 531). The west-trending vein is explored by a 6-foot shaft, now caved, from which a 20-foot drift was driven east (personal communication, Frank Koehn). In addition this vein is exposed in an excavation near the junction of Santa Rosa Road and a dirt road which extends southward to Rancho El Nido.

Production: In the period 1896 to 1901, 850 ounces of gold and 806 ounces of silver were credited to this mine (U. S. Bureau of Mines records). No figures were found for the tonnage of ore removed.

References: Crawford, 1896, p. 311; Mining and
Scientific Press, 1899, vol. 79, p. 750; Merrill and
Waring, 1917, p. 531; Tucker and Sampson, 1929, p. 482;
Sampson, 1935, p. 512.

R.B.S. 9/24/59

Iron Chief Mine

Location: Sec. 35?, T. 3 S., R. 13 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Eagle Mountains, about 1½ miles southeast of the Black Eagle mine and 11 miles northeast of the East Pinto Basin-West Pinto Basin-Cottonwood Pass and Black Eagle mine roads intersection.

Ownership: Kaiser Steel Corporation, P.O. Box 217, Fontana, own^S at least 6 patented claims - The Gray Eagle Group (March 1960).

History: Tucker (1924, p. 192) reports that the property was originally located by William Stevens and Thomas Dolfflemeyer of San Bernardino. In 1897 the mine was reportedly sold to Charles Lane of San Francisco, who installed a small mill and operated the mine for several years. Mr. Lane did not complete payments on the property and the original owners took over installing a 50-ton cyanide plant, operating the mine and mill until about 1902 (Tucker, 1924, p. 192). From 1902 to at least 1909 the Southern Pacific Railroad Company apparently owned and worked the mine (Tucker, 1924, p. 192). Production was recorded in 1900 and 1901. Apparently little if any work beyond assessment work has been done since 1909 and 6 claims (Gray Eagle Group) were patented in 1915.

Jean (Postmaster) Mine #197

Location: N $\frac{1}{2}$ sec. 35 (proj.), T. 1 S., R. 23 E., S.B.M., Vidal quadrangle, 1950; on the northwest slope of the Riverside Mountains 5 miles south-southwest of Vidal.

Ownership: Undetermined (1958).

JOHN R. SHAWERS, 963 HELMICK ST
CARSON, CA 1974, 23 FEB.

(MWS-11-7)

History: The Jean mine is so named on the Vidal quadrangle map but this name was not found in the literature. The mine was identified as the Postmaster mine by Danny G. Figueroa (personal communication) but this name has also escaped previous reports. It is probable that this is the property being worked by Bethel Mining and Lasing Company in 1929 (Tucker and Sampson, 1929, p. 473). In 1930 that company recorded gold production from a claim named Rattler (U.S. Bureau of Mines file), located in the same area and possibly the same mine.

Geology: The rocks in the mine area are contorted gneisses, quartzite, schist, and hornfels cut by quartz veins and mineralized faults. The veins and faults strike from N. 20° E. to N. 30° W. and dip about 40° NW. or SW. A barren vein of massive white quartz 2 to 4 feet wide crops out on these claims near the main camp site. However, few of the veins that have been mined are more than 2 feet wide. Most of the veins actually consist of numerous closely-spaced veinlets. Minerals noted associated with the quartz are chalcopyrite and hematite and less commonly, calcite and barite.

CONT on

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Jackknife Mine

See Morning Star Mine.

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Development: Though the underground extent of the mine was not determined, at least 2 veins have been exploited from the surface.

?
Jean
M. M. M.

Development consists of 1 inclined shaft, 1 vertical shaft, 2 adits and prospect pits. The principal shaft is inclined 45° NW. and extends to an undetermined depth on a shear zone mineralized with quartz stringers and veins. About 150 feet northeast of the inclined shaft is a vertical shaft of unknown depth. These 2 shafts are in the area of the main campsite. About 600 feet north of the campsite an inclined adit extends 20 feet southwest on a 12-18 inch-wide quartz vein striking N. 10° E. and dipping 40° SE. in platy schist. Up the slope to the east of the campsite about 1,000 feet is an adit driven southeast a reported distance of 1000 feet from which stoping extend 100 or more feet northeast to the surface (Danny G. Figueroa, personal communication). This adit explores a fault zone 12 to 18 inches wide striking N. 20° W. and dipping 35° SW. At the portal an 8 inch quartz vein is exposed from which veinlets branch over a width of about 2 feet. The vein narrows to a width of 2 to 6 inches where exposed in a stope, opening to the surface several hundred feet northeast of the adit portal.

GO FURTHER

-514

1207 chiel

Geology: The mine is in a contact area between calcitic dolomite and quartz monzonite (see fig. 1/). An oxidized zone composed mainly of hematite and quartz, 12 feet in maximum width and 6 feet in average width, contained \$10 per ton of gold to a depth of 100 feet, where a sulfide zone containing chalcopyrite and pyrite was encountered. The mine operated at a profit in the oxidized zone but closed down when the sulfide zone was reached. The oxidized zone trends N. 70° W. and dips 45° N. (Tucker and Sampson, 1929, p. 482).

Development: A vertical shaft is sunk 140 feet deep on the contact of quartz monzonite and dolomite and is intersected at the 100-foot level by a crosscut adit driven 500 feet south to intersect the oxidized zone. At this level there is at least 500 feet of drifting in the oxidized zone which has been stoped to the surface over a length of 300 feet (Tucker and Sampson, 1929, p. 482). In 1924 about 20,000 tons of tailings assaying 90¢ per ton in gold were disposed in the gulch, immediately south of the mine (Tucker, 1924, unpublished Field Report No. 83). About 8000 tons of tailings were still on the property as late as 1945 (Tucker and Sampson, 1945, p. 136). The mine is now filled in, boarded over, and of course inaccessible. It is at an elevation of 2500 feet and adjacent to the Black Eagle mine dirt road.

Production: The U. S. Bureau of Mines records show a production in 1900 of 142 ounces of gold extracted from 3,012 tons of crude ore, and in 1901 of 1,667 ounces of gold extracted from 2,515 tons of crude ore. Tucker and Sampson (1929, p. 482) report a value of \$150,000 for total production.

References: Tucker, 1924, pp. 191-192; Tucker, 1924, unpublished Field Report No. 83; Tucker and Sampson, 1929, p. 482; Tucker and Sampson, 1945, p. 136.

J.R.E. 3/17/60

Original

Figure 1/. Geologic map of Iron Chief gold mine and adjacent area. The quartzites and dolomite are part of a series of old metasedimentary rocks intruded by quartz monzonite, and dikes of intermediate composition. The contact rocks and replacement iron bodies are a result of the intrusion of quartz monzonite into calcitic dolomite.

JEAN MINE

The collars of the shafts are timbered and a weathered head frame remains at the head of the stope. All other structures and equipment have been destroyed or removed. The mine is open and dry as far as could be determined but apparently has been idle for many years. The road shown on the map is good to within half a mile of the mine, but is badly gullied where it descends into a wash in the northwest corner of Sec. 35 (Dec. 1957). (INACCESSIBLE BY CAR, OCT 1979)
mu

Production: U. S. Bureau of Mines records show that in 1930, 12 tons of ore taken from the "Rattler" (probably the Jean mine) yielded 26.89 ounces of gold and 9 ounces of silver.

References: Tucker and Sampson, 1929, p. 473.
R.B.S. and C.H.G. 12/18/57.

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513?

Gold

John's Camp

Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 4 (proj.), T. 2 S., R. 9 E., S.B.M., Twentynine Palms quadrangle, 1955; Joshua Tree National Monument, 8 miles south of Twentynine Palms.

Ownership: Undetermined.

History: Undetermined; old mill foundations at site are dated 1931. Apparently long idle.

Geology: Shear zones in coarse-grained quartz monzonite (Palms quartz monzonite of Rogers, 1954). The principal adit on the east side of a narrow canyon explores a shear and gouge zone 1 to 2 feet thick, which strikes north and is vertical to steeply east-dipping. Several hundred feet up the hill a second shear zone trends N. 45° E.

Development: A drift adit, of undetermined extent, is driven on the north-trending shear zone, and the zone has been opened by minor trenches above. The northeast-trending zones above have been explored by 4 short drift adits and shallow pits. To the west, across the canyon, is another adit, and there are several caved adits several hundred yards to the east.

Production: Undetermined.

References: Rogers, 1954, map sheet 24.

C.H.G. 5/19/61.

Juanita No. 5

See Mountain Queen Mine.

Jumbo Mine

Location: SE $\frac{1}{4}$ sec. 30, NE $\frac{1}{4}$ sec. 31, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7.5', 1953; about 6 $\frac{1}{2}$ miles west of Perris. The claim lies athwart a low ridge just south of Santa Rosa Road (figure ___/).

Ownership: Undetermined.

History: The Jumbo Mine was reported active as early as 1896 at which time it was owned by M. E. Bethrum, Perris (Crawford, 1896, p. 312). Although subsequent reports add nothing to the 1896 description, the present condition of the property suggests considerable activity since 1896. U. S. Bureau of Mines files show that the Jumbo was active as late as 1900 and that S. T. Crawford, and a party named Stanford, both of Perris, held the mine in the years 1899 and 1900 respectively.

Geology: A poorly exposed shear zone as much as one foot wide contains thin, discontinuous veins and pods of crushed quartz ranging from 0 to about 2 inches in thickness. The shear zone strikes N. 10° W. across a ridge of deeply weathered diorite and dips about 80° SW. The crushed vein quartz is stained and pocketed with iron oxides. It has yielded gold and silver but assay data are lacking.

Development: The earliest reported development consisted of a 50-foot shaft (Crawford, 1896, p. 312) but inspection of the property revealed that, in addition, at least one adit and several other shafts or deep prospect pits were opened. A foundation suggests that a mill had been installed. When visited (1959) the workings were caved and inaccessible.

Production: During the four reported years, 1896, 97, 99 and 1900, U. S. Bureau of Mines records show that a total of 1,332.10 ounces of gold and 477 ounces of silver were won from an unreported tonnage of ore. These figures seem high but they might constitute an unapportioned total resulting from the milling of ore from a number of small nearby mines.

References: Crawford, 1896, p. 312; Tucker and Sampson, 1929, p. 482; 1945, pl. 35; Sampson, 1935, p. 512.

R.B.S. 9/23/59

Keystone Mine

See Tubbs Claims (tungsten-gold).

Lane Mine

Location: Sec. 10 (proj.), T. 6 S., R. 15 E., S. 13. 117,

U. S. Army Corps of Engineers Chuckwalla Mountains quadrangle, 15', 1945; in the Chuckwalla Mountains, 3 3/4 miles south of Desert Center. This mine is accessible only by means of faint trails from the Aztec Well area and from the Granite mine.

Ownership: Undetermined (1959).

History: Early reports barely mention the Lane mine but their dates, 1896 (Crawford, p. 312) and 1919 (Merrill and Waring, p. 540) mark times during its early development, and, at the later date, after operations had ceased.

Geology: A shear zone with a maximum width of 5 feet is exposed for about 500 feet along the south slope of a granite ridge. It strikes N. 50° W. and dips 45° NE. Contained within the shear zone is a crushed quartz vein as much as 2 feet wide which is unevenly mineralized with oxides of iron and traces of secondary copper minerals.

Development: The vein has been explored by means of a 50-foot shaft, 3 shallow shafts 10 to 20 feet deep, and an open-cut. The shafts are inclined on the dip of the vein. In addition, there is a shallow pit which appears to be the collar of a caved shaft.

Production: Undetermined.

References: Crawford, 1896, p. 312; Merrill and Waring, 1919, p. 540.

R.B.S. 4/29/59.

Langdon Claim

Location: SW $\frac{1}{4}$, sec. 10 (proj.), T. 4 S., R. 22 E., S.B.M., Big Maria Mountains quadrangle, 1951; about 6 miles by dirt road and trail east of Midland Road and 3 miles northeast of Black Hill.

Ownership: Undetermined (1958).

History: According to Mr. George Ringwald, Blythe, (personal communication 1/12/59) this property was worked from 1932 to 1934 by a man named Langdon.

Geology: The country rock, gneiss cut by quartz-feldspar pegmatite dikes, is faulted. The faults are poorly exposed. One, explored by the north workings, is vertical and strikes N. 45° E. Another, in the southern workings, strikes N. 85° W. and dips 80° NE. Gold-bearing quartz veins of undetermined extent lie in the fault planes. They range from a fraction of an inch to as much as a foot in thickness. Fractures and pockets in the veins are filled with iron oxides.

Development: The north workings comprise a 20-foot drift adit from the end of which a 17-foot raise was driven to the surface. The south working, in a narrow ravine about 1,000 feet to the southeast of the north adit, consists of a 50-foot inclined shaft.

Production: ^{6.1}Not determined.

References: None.

R.B.S. 12/19/58.

La Plomo Mine

See Top of the World Mine.

La Rica Mine

See Stone House Mine.

Laseter Mine

See: Lost Angel mine.

Last Chance Mine

Location: Sec. 26 (?), T. 6 S., R. 15 E., S.B.M.,
U. S. Army Corps of Engineers Chuckwalla Mountains quad-
rangle, 15', 1945; in the Chuckwalla Mountains about one
mile south of Antec Well and 3 miles west of Corn Spring.
This property is about a quarter of a mile southeast of
the C.O.D. mine and probably lies along the same fault
zone.

Ownership: ^{Not} determined (1959).

History: Last held, in 1948, by E. M. White.

Geology: A vertical fault zone as wide as 4 feet, which
strikes N. 20° W., is poorly exposed for about 200 feet
on a low granite ridge. Quartz veins and lenses as much
as 5 inches wide are unevenly distributed in the fault
plane. The veins are stained and pocketed with iron
oxides. Calcite is present but not common.

Development: The fault zone on the ^e _^ north of the ridge
has been explored by means of a 20-foot adit. A 10-foot
prospect pit in the fault zone lies about 75 feet up the
slope from the adit.

Production: Not determined.

References: None.

R.B.S. 5/1/59.

4312

Leon Mine

Location: NW¹/₄ NW¹/₄ sec. 18, T. 6 S., R. 2 W., S.B.M., Romoland quadrangle, 7¹/₂', 1953; about 6 miles south-south-east of Romoland.

Ownership: Hans Christensen, Romoland, one patented claim.

History: According to early reports the Leon Mine was opened in the late 1800's (Crawford, 1894, p. 223). By 1917 it was still being referred to as "a promising prospect" (Merrill and Waring, 1917, p. 534-535). The actual amount of gold taken from the property was not recorded. According to U. S. Bureau of Mines records, during the years 1950 to 1953 the property was worked by W. A., M. E., and R. H. Obarr, 1541 Freeman Ave., Long Beach.

Geology: A shear zone as much as 3 feet wide strikes N. 55° W. and dips 70° N.E. across the southwest slope of a hill underlain by metasedimentary and metavolcanic rocks. Quartz vein material of undetermined average thickness is distributed unevenly in the shear zone. The shear is exposed for about 1,500 feet.

Development: Two vertical shafts, a shallow pit, and a trench explore the vein. The collars of the shafts are on the vein and about 200 feet apart, the northwesterly one being higher than the other by about 50 vertical feet. The northwest shaft, now caved, was once reported to be 150 feet deep (Crawford, 1896, p. 312). A small sheet-iron shack, which housed the hoisting machinery, still stands near it. The southeast shaft is open and untimbered as far down as could be observed from the partially caved collar. Its depth was not determined. The pit and trench lie between the two shafts and are simply shallow prospects on the shear zone.

Production: In 1950, 3 tons of ore yielded 1 ounce of gold and 1 ounce of silver (U. S. Bureau of Mines records, published with permission of the owner).

References: Crawford, 1894, 223; 1896, p. 312; Meyvill and Waring, 17, p. 534
Tucker and Sampson, 1929, p. 483.

R.B.S. 10/22/58.

Liberty Group

See: Tubbs Claims (under tungsten).

Little Maggie

See Maggie Mine.

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Long Shot #1

See Lum Gray Mine.

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Lost Angel (Laseter, Sippi?) Mine

Location: SW $\frac{1}{4}$ sec. 35, T. 3 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree
National Monument in a narrow canyon high on the south-
west slope of the Little San Bernardino Mountains,
2 3/4 miles southwest of Pinyon Well. This mine previous-
ly, and apparently erroneously, was reported in sec. 22,
T. 3 S., R. 8 E., S.B.M. (Tucker and Sampson, 1945,
p. 137).

Ownership: Clyde Jones, P.O. Box 1678, Indio (1957).

History: The Sippi mine, which probably is the Lost
Angel, is said to have been worked by a Mr. McFarland
in the 1890's. The Lost Angel was owned many years ago
by W. H. Laseter, Twentynine Palms. The property was
leased to C. L. Woods, Indio, from 1937-1945 when the
mine comprised 8 claims. A. F. Perry acquired the
holdings in 1945 and subsequently sold them to Clyde
Jones in 1956. Apparently the mine has not been worked
since about 1937.

Geology: The mine workings explore a 5-foot wide shear
zone in biotite-diorite gneiss and biotite schist (Chuck-
walla complex) on the west side of the canyon. The shear
zone strikes N. 80° W., is vertical, and contains discon-
tinuous quartz stringers as much as 1 foot wide.

Los Angeles Mine

See Brooklyn mine.

Lost Horse Mine

Location: SW¹/₄NW¹/₄ sec. 3, T. 3 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree National
Monument, 3 miles southeast of Ryan Campbround and Lost
Horse Well, on the east side of a small valley high in
the central part of Lost Horse Mountain.

Ownership: Leanta Stafford Ryan, 242 E. Center,
Covina holds one patented claim of 13.5 acres.*

History: The gold-bearing vein, developed by the
Lost Horse Mine, was worked as early as 1894 when ore
was hauled to the Pinon Mountain mill (apparently
located at the present El Dorado patented mill site at
Pinyon Well). During this early development, ^{Fife,**} Lang,
Holland, and Tingman, of Indio were the owners of 2

claims (Crawford, 1896, p. 223). The area was surveyed
for patent in 1895 and a patent was issued in 1897 to

Nathan Ryan and others. Apparently the mine was in
almost continuous operation from 1895-1908, but under
several operators: 1896-98, Thos. C. Ryan; 1899-1900,
Lost Horse Mining and Milling Company; 1901, 1905, S. M.

Kelsey; 1906, 1908, Lost Horse Mining and Milling Company.

* Sold to Park Service 1968[±] - Now being made into tourist attraction.
(1975).

** John James Fife - original locator - see Riverside
County Recorder Book #1.

- DLF 1975

By 1896 a 2-stamp mill had been built several miles north of the mine, probably at Lost Horse Well. Workings included a 80-foot drift adit, 50-foot winze, 50-foot drift from the bottom of the winze, and a 235-foot vertical shaft with a horse-whim (Crawford, 1896, p. 312). In 1929 Tucker and Sampson (p.483) reported the shaft was 500 feet deep and a 10-stamp mill was at the mine. Water was piped to the mine from Lost Horse well.

After being idle for about 20 years the mine was reopened in 1931 under lease by Gen'l Mining and Development Company who mined pillars of ore from the upper levels and milled in the 10-stamp mill. The last activity apparently was in 1936 when J. D. Ryan processed 600 tons of tailing. The operation during the 1930's yielded only a few hundred ounces of gold and local residents report the vein was faulted off at depth and drifting failed to find the vein. Apparently long idle.

Geology: The mine area is underlain by dark well-foliated thin banded quartz-biotite gneiss (Pinto gneiss). The banding strikes north to N. 40° W. and is steeply dipping to vertical. According to Merrill (1917 p. 536) the principal workings explore a quartz vein which strikes east, dips 85° N., ranges from 6 inches to 5 feet in width, and is exposed on the surface at several points for about 800 feet. In June 1957, the vein could not be observed in the main shaft because of timbering, but the dump material contained iron-stained vein quartz, gneiss, and black mica schist. Twenty feet east of the shaft a 4-inch quartz vein strikes N. 20° E., and is vertical. Two shallow shafts, 300 and 500 feet to the east on the ridge explore east-striking vertical, thin, iron-stained quartz veins in shear zones in gneiss. Where best defined in the upper shaft the shears strike N. 15° W., and dip 70° SW.

Development: The Lost Horse mine workings consist chiefly of a 500-foot vertical shaft with a small amount of drifting on the vein on the 100, 200, 300, and 400-foot levels (Tucker and Sampson, 1945, p. 137). About 100 feet west of the main shaft an adit is driven N. 80° E. along a 5-foot wide shear zone. Apparently this is the adit described by Merrill (1917, p. 536) as being 80 feet long with a 50-foot winze and a 50-foot drift east driven from the bottom of the winze. The vein also has been explored by 2 shallow shafts, 300 and 500 feet east of the main shaft, and by several pits. In 1957 a vertical headframe, several partially collapsed wooden and stone buildings, and a largely dismantled 10-stamp mill remained on the property.

Production: This property has been credited (Chesterman, 1957, p. 79) with the only production of bismuth in California and the 20 tons of bismuth ore produced in 1904 are listed as being from the Lost Horse, formerly the Lang copper mine. It appears this report is erroneous as a long time local resident, Mr. William F. Keyes, states the bismuth ore came from the Sulphide Bismuth mine (see herein) in the early 1900's, when the property was known as the Lang Copper mine, but Mr. Lang also apparently was a partner in the Lost Horse mine. No evidence of copper or sulfide mineralization was observed at the Lost Horse mine.

Tucker and Sampson (1945, p. 137) report the total value of gold from the Lost Horse mine as \$350,000. This is in rough agreement with the more than 10,000 ounces of gold and 16,000 ounces of silver reported (U.S. Bureau of Mines records) to have been recovered from an undetermined tonnage of ore and 600 tons of tailings ^{yielded} (produced) by the Lost Horse mine from 1895 to 1936. ^

References: Crawford; 1894, p. 223; Crawford, 1896,
p. 312; Mining and Scientific Press, 1900 (May, vol. 80,
no. 18) p. 494; Merrill, 1917 [1919] p. 536; Tucker and
Sampson, 1929, p. 483; Tucker and Sampson, 1945, p. 137;
Chesterman, 1957, p. 79.

C.H.G. 6/28/57.

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Lost Mine Parallel

See: Hidden mine.

Lost Pony Mine

Location: Sec. 24, T. 6 S., R. 14 E., S.B.M., U. S. Army Corps of Engineers, 15', Chuckwalla Mtns. quadrangle, 1945; on the southwest slope of the Chuckwalla Mountains 6 3/4 miles southwest of Desert Center. The mine is marked on the quadrangle map.

Ownership: Undetermined.

History: The Lost Pony mine appears to be an old property, but its date of location was not determined. In the early 1940's the mine was owned by Dell Barnum, Desert Center. In 1940 Desert Center Mining Company leased and operated the property for an undetermined period (Tucker and Sampson, 1945, p. 137).

Geology: The country rock is gneissic granite cut by aplite and pegmatite dikes as much as 3 feet wide. The gneissic structure has a general strike about N. 10° W. A fault zone, traceable for about 1100 feet, strikes west nearly at right angles to the structure of country rock and dips 50° S. A fine-grained, basic dike ranging from 5 to 30 feet in thickness lies in the fault zone. Quartz veins ranging from 0 to 1 foot in thickness lie along the footwall of the fault zone.

The veins and the dike are fractured, probably by recurrent movement on the fault. The most pronounced shearing followed the footwall creating irregular masses of gouge as much as 3 feet wide in which a large proportion of the vein quartz was dragged and crushed. Minerals observed in the ore are calcite, siderite, chlorite, magnetite, hydrous iron oxides, and scattered stains and thin crusts of chrysocolla. No data on the gold content of the deposit were obtained.

Other quartz veins strike , parallel to the fault and crop out 50 to 100 feet south of it. These veins appear to be barren. In addition a second basic dike, 40 feet wide, is exposed 75 feet north of and parallel to the fault but it does not appear to be associated with a fault or vein.

Development: Two shafts, 50 and 80 feet deep, were sunk in the hanging wall. These shafts probably connect with workings serviced by 6 inclined shafts driven on the vein but because of the poor condition of the mine no entry was made to check the extent of development.

The mine was reported to be at least 200 feet deep with drifts on the 50, 100, and 200 foot levels (Tucker and Sampson, 1945, p. 137). In addition there is a trench and several prospect pits and, near the west end of the outcrop, there is a 50-foot crosscut adit in the hanging wall from which a drift runs 60 feet east on the vein. A 60-foot shaft explores the dike, exposed to the north of the fault, with apparently negative results.

Production: Desert Center Mining Company made a number of shipments of high-grade ore to American Smelting and Refining Company's smelter, Garfield, Utah but the tonnage and grade was not reported (Tucker and Sampson, 1945, p. 137). Idle (1959).

References: Tucker and Sampson, 1945, p. 137, pl. 35.

R.B.S. 11/16/59

Lost River Placer Claim

See Chuckwalla Spring Placers.

Louise Mine

Location: Sec. 17, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Pinto Mountains, about $1\frac{1}{2}$ miles west of the Gold Crown mine and 4 miles southwest of New Dale (Site). (See pl. 3/).

Ownership: Emmett Bethurum, Box 111, Amboy, owns 2 unpatented lode claims (March 1958).

History: The mine was originally located in the late 1920's by Jack Meek and E. V. Evans, and was active in 1929 (Tucker and Sampson, 1929, p. 483). Emmett Bethurum owned and operated the mine from 1937 to 1939.

Geology: Quartz monzonite is cut by a north-trending and nearly vertical fault containing a quartz vein 2 feet in average thickness. Tucker and Sampson (1929, p. 483) report that the vein is mineralized with galena, chalcopyrite, and shows free gold.

Development: The main shaft is sunk vertically on the vein to an undetermined depth. Probably drifts extend from the shaft at one or more levels. Other workings of minor extent, consisting mainly of shallow shafts and surface trenches, are randomly distributed about 350 feet south along the fault trace from the main shaft.

Production: In the years 1937 through 1939 the Louise mine yielded 108 tons of ore from which 35 ounces of gold, 51 ounces of silver, 209 pounds of copper and 1,292 pounds of lead were ^{covered} removed.

References: Tucker and Sampson, 1929, pp. 483-484; Goodwin, 1957, p. 604. J.R.E. 3/30/60

Lucky Boy Mine

See Elton Mine.

Lucky Boy (Walker Claim) Mine

Location: SE $\frac{1}{4}$ sec. 9, T. 6 S., R. 3 W., S.B.M., Romoland quadrangle, 7 $\frac{1}{2}$ ', 1953; about 9 miles south of Perris, in a cultivated area between two low, rounded hills.

Ownership: Undetermined.

History: This deposit was discovered in 1892. Development proceeded slowly under the ownership of Sam Walker, Menifee (Storms, 1893, p. 385; Crawford, 1894, p. 223-224; personal communication, John D. Walker). In 1917 the owner was reported dead (Merrill and Waring, 1917, p. 534) and, since that date, the mine has remained idle.

Geology: The country rock at the mine is deeply weathered diorite. The whole outcrop is barely 100 feet long and brush, soil, and the caved state of the mine obscure the deposit. The vein appears to strike about N. 55° W. and, according to John Walker, son of the original owner, it is vertical. It was reported to range from 4 inches to one foot in thickness and to be faulted in two places. (Storms, 1893, p. 385). The vein is fractured and the quartz is recemented and pocketed with iron oxides. There appears to be no report on the gold content except some high grade estimated by Storms to run about \$65 per ton. Pyrite is present in the ore below the water table (personal communication, J. D. Walker).

Development: The workings are filled or caved but formerly two shafts, 50 and 60 feet deep respectively, were sunk on the vein. Water was reported to be the principal problem (Crawford, 1896, p. 312).

Production: Undetermined. ~~Idle (1959)~~.

References: Storms, 1893, p. 385; Crawford, 1894, p. 223-224; 1896, p. 312; Merrill and Waring, 1917, p. 534; Tucker and Sampson, 1929, p. 484; 1945, pl. 35; Sampson, 1935, p. 513.

R.B.S. 10/20/59.

Lucky Dollar Mine

Location: Sec. 24 (?), T. 5 S., R. 1 E., S.B.M., U. S. Army Corp of Engineers, ~~15~~, Canyon Spring quadrangle, 15, 1944; about 3 miles east-northeast of Hayfield Pumping Station and a little more than half a mile east-southeast of the Golden Eagle Mine, at the south edge of the Eagle Mountains.

Ownership: Undetermined.

History: Papers found at the mine show that it was claimed in 1940 by C. H. Kelly. No records for other years were found.

Geology: A quartz vein, ranging from 0 to 3 inches in thickness, lies along the hanging wall of a fault zone, as much as 4 feet wide, which is poorly exposed on the crest of a narrow granite ridge. The fault strikes N. 45° E. and dips 45° SE. Voids and fractures in the vein carry oxides of iron which ~~has~~ probably formed from the weathering of sulfides. Gold, where present, is a free-milling residue as ⁱⁿ with other ores in the area.

Development: The outcrop ^{mine} ~~is~~ penetrated by a 12-foot, inclined shaft. A crosscut adit was driven southeast from a point about 100 feet down the slope to the west. It appears to be at least 100 feet long but whether or not it reaches the vein was not determined ^{because of} ~~due to~~ the unsafe condition of the back.

The tonnage yield reported for the year 1940 suggests that the vein was reached and worked, but little vein material was found on the dump.

Production: U. S. Bureau of Mines records show that in 1940 the Lucky Dollar yielded 9 tons of ore from which 10 ounces of gold and 4 ounces of silver were recovered.

References: None.

R.B.S. 11/20/59

Lucky Lady Claim

Location: SE $\frac{1}{4}$ sec. 19 (proj.), T. 7 S., R. 17 E., S.B.M., Sidewinder Well quadrangle, 1952; southwest of the Aztec and Rainbow Claims. It is at the northeast base of a ridge and is reached by a side road off Dupont Road.

Ownership: Undetermined.

History: This property was developed during the 1930's and worked for a period of short but unrecorded duration (J. Dupont, personal communication).

Geology: The property was not visited but probably resembles the nearby Aztec and Rainbow Claims, which are on northwest-trending, gold-bearing quartz veins in gneissic country rock.

Development: The deposit was explored by a single shaft, 75 feet deep.

Production: Undetermined. Mr. J. Dupont stated that some ore of good grade was taken from the claim.

References: None.

R.B.S. 4/28/59.

Lucky Strike (Ophir) Mine

This report is based largely on information recently contained in a/published description by Engel, Gay and Rogers (1959, p. 67-68) .

Location: Sec. 21, T. 5 S., R. 4 W., S.B.M., U.S. Army Corps of Engineers Lake Elsinore quadrangle, 15', 1942; at the northeast base of a low hill just southeast of Highway 74, about 3 miles northeast of Elsinore.

Ownership: R. S. Fisher and R. L. Read, Elsinore (1945) own an undetermined area of patented land (formerly railroad land) including the mine.

History: The Lucky Strike was reported active in 191⁷ (Merrill and Waring, p. 529).

Geology: The country rock is deeply-weathered quartz diorite. A quartz vein, about 15 inches wide at the surface, strikes N. 80° E., and dips 45° S. in the collar of the main shaft, but apparently turns to strike N. 55° E. and dip 55° SE. where exposed 100 feet to the east. The vein is discontinuously exposed for several hundred feet across the hill. At the surface, the vein quartz is strongly stained with iron oxides and has a well-defined clay selvage. A second, more northerly vein, not exposed on the surface, is reported also to strike east, but to dip 35° and intersect the main vein at the 50-foot level. The veins contain free gold, silver, marcasite, pyrite, arsenopyrite, and copper oxide stains; the north vein has the higher silver content. On the 50-foot level the vein is reported to range from 2 to 24 inches in thickness with an average thickness of about 10 inches. On this level the oreshoot is reported to be about 85 feet long. Some of the ore was reported to bear 25 ounces of silver and \$8 in gold per ton (Sampson, 1935, p. 513).

Development: Mine openings include the main shaft, inclined 45° along the main vein and 150 feet deep, and a second inclined shaft of undetermined depth about 100 feet to the east. In 1955 both shafts were caved at a depth of about 30 feet and inaccessible. Past reports indicate the existence of a 100-foot drift to the north (presumably east) of the main shaft on the 50-foot level, and a 150-foot drift in the same direction on the 150-foot level. In 1935 the lower level, though under water, was reported to have exposed a 30-inch-width of sulphide ore.

Production: Undetermined.

References: Crawford, 1896, p. 313; Merrill and Waring, 191⁷9, p. 529; Tucker and Sampson, 1929, p. 486; 1945, p. 137-138; Sampson 1935, p. 513; Engel and others, 1959, p. 67-68.

R.B.S., from Engel and others.

Development: The shear zone is explored by one vertical shaft, 700-800 feet to the northwest of which is a shaft inclined 60° SW., and an undetermined amount of sub-surface work. According to Tucker and Sampson (1945, p. 138) the vertical shaft was said to be 990 feet deep. In an earlier report (Tucker and Sampson, 1929, p. 481) it is stated that there are 700 feet of drifts and crosscuts at the 300-foot level and that a winze descends from that level to a depth of 229 feet from which there are 300 feet of drifts and crosscuts at various levels. A stope reaches the surface 40 - 50 feet south of the inclined shaft. This may be the work referred to by Tucker and Sampson (1945, p. 138) as having been done from a drift off a 175-foot shaft, possibly the inclined shaft noted above.

When visited in April, 1958, the shafts were open and dry and well timbered. The stope was still open and the stulls sound. Nothing remains of former mine buildings but the foundations. The shafts have no head frames but access is good and portable frames could easily be installed.

Geology: The country rock consists of contorted and sheared metasedimentary rocks comprising schist and limestone. They strike N. 70° W. and dip 70° SW. in the mine area. Ore minerals form deposits along a shear zone which roughly parallels the structure of the rocks. The shear zone is exposed ^{discontinuously} ~~unevenly~~ for about 1,000 feet along the strike. It contains quartz veins as much as one foot in thickness. Much of the wall rock near the veins contains chrysocolla and iron oxides in fissures and shears. Much of the quartz vein material is brecciated. The ore minerals in the vein and enclosing rock are hematite, limonite (in part as pseudomorphs after pyrite), chrysocolla, malachite, pyrite, and manganese oxide.

The vein is reported to carry approximately 0.75 ounces per ton in gold and to be free milling down to 150 feet. Below that depth pyrite becomes abundant (Tucker and Sampson, 1945, p. 138).

Lum Gray (Arica, Gray, Long Shot, Priest) Mine

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 12, T. 2 S., R. 19 E., S.B.M., Rice quadrangle, 1954; west of the main ridge of the Arica Mountains in a shallow valley 6 $\frac{1}{2}$ miles southwest of Rice.

Ownership: Undetermined (1958).

History: According to Tucker and Sampson (1929, p. 481), this mine was worked by Assets Realizing Company from 1909 to December 1912, at which time operations were suspended. These authors state that the property was subsequently relocated by one E. E. Schellenger as the Arica claim. Merrill and Waring (1917, p. 541-542) reported that, when visited in November of 1914 the Gray Mine was leased (owner not specified) to "Assets Realizing Mines Company".

Edward W. Rowe, Rice, the last reported owner, operated this property under the name Long Shot #1 during the years 1950, 51, and 53 (U. S. Bureau of Mines records).

Production: During its intermittent development in the years between 1912 and 1950 the Lum Gray mine yielded as much as 1,200 tons of ore from which 1,100 ounces of gold, 534 ounces of silver, 6,911 pounds of copper and 920 pounds of lead were recovered.

References: Merrill and Waring, 1917, p. 541-542; Tucker and Sampson, 1929, p. 431; 1945, p. 138, pl. 35; Goodwin, 1957, p. 604.
R.B.S. 4/11/58.

Development: The vein is explored by 4 inclined shafts, ^{now} in poor repair. One is flooded below the 50-foot level. Two others are partially filled with debris and are about 30 feet deep. The fourth shaft is about 40 feet deep. At these depths only a small amount of drifting and stoping was done. Three of these shafts were reported to be 175 feet, 75 feet and 75 feet deep respectively (Tucker and Sampson, 1945, p. 136), but ^{could} ^{be} ^{in 1957} were not identified because of the flooded or filled condition of the mine. An old ball mill was still on the property when it was visited (1959).

Production: The only recorded production from the Maggie Mine was ² ~~two~~ tons of ore for the year 1940, which yielded 1 ounce of gold (U. S. Bureau of Mines records).

References: Crawford, 1894, p. 223; 1896, p. 312; Mining and Scientific Press, 1895, vol. 70, p. 106; Merrill and Waring, 1917, p. 531; Tucker and Sampson, 1929, p. 483; 1945, p. 136-137, pl. 35; Sampson, 1935, p. 512.

R.B.S. 9/24/59

Maggie (Little Maggie) Mine

Location: NW¹/₄ sec. 32, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle 7.5', 1953; about 6 miles west of Perris. (21-1-1).

Ownership: Charles Hess, 4427 Larchwood Place, Riverside (1958).

History: This mine was located prior to 1894. By that year an arrastra had been built and development was proceeding under the ownership of J. M. Hasson, Perris (Crawford, 1894, p. 223). The mine was idle in 1896 (Crawford, 1896, p. 312). Activity was next reported in 1935 at which time a Chilean mill was being used. The owner was Chas. Lanhorn, Box 152, Perris (Sampson, 1935, p. 512). The mine was worked in 1940 by Charles Hess, Riverside, probably under lease (U. S. Bureau of Mines records). In 1945 it was reported idle (Tucker and Sampson, 1945, p. 136-137, pl. 35).

Geology: This mine area is underlain by deeply weathered diorite. A narrow shear, rarely exceeding 4 inches in width, strikes N. 85° W. and dips 50° SW. The shear contains crushed and pulverized vein quartz material reported to be as much as 8 inches wide (Tucker and Sampson, 1945, p. 136). It has an indistinct surface exposure of about 100 feet.

Mammoth Group

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 8, T. 6 S., R. 3 W., S.B.M.,
Romoland quadrangle, 7.5', 1953; about 10 miles south of
Perris.

Ownership: John Rostas, Route 1, Romoland.

History: According to U. S. Bureau of Land Management
records, this group, comprising the 2 claims, Edith and
Mammoth, was patented by F. A. Stephens, et al., in
1896. At that time development of the mine was already
well advanced (Crawford, 1896, p. 312). The claims
were owned by A. A. Adair, Riverside, in 1917, (Merrill
and Waring, 1917, p. 534) but there was no report of
activity or since.

Geology: A lenticular body of quartz is well exposed
on the southeast slope of a low granodiorite ridge through
a horizontal distance of about 250 feet (fig. ___/). The
vein strikes northeast, dips about 15° northwest, and is
as much as 7 feet thick. Fractures and fissures in the
quartz are filled or lined with iron oxides. In addition,
the vein contains free-milling gold and pyrite. No
assay data were found.

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Development: The deposit has been explored by means of a 50-foot shaft, an inclined shaft, an adit, and two open-cuts, arranged as shown in figure __/. In addition there are several shallow prospects.

The inclined shaft is reported to be 200 feet deep and to join with the vertical shaft through a crosscut drift (Crawford, 1896, p. 312). The portal of the inclined shaft is at the face of an open-cut as much as 8 feet deep and 60 feet long, cut in the broad, west lobe of the vein outcrop. The cut and shaft bear N. 40° W. The tapering, east end of the outcrop is explored by the adit and second open-cut. The adit extends N. 40° W. for 60 feet. The open cut, 40 feet farther east, is parallel to the adit and is 30 feet long. At the adit portal the vein appears to have divided into three roughly parallel veins as much as 6 inches thick separated by tabular bodies of country rock 1 - 2 feet in thickness.

Production: Undetermined. ~~1818 (1959)~~

References: Crawford, 1896, p. 312; Mining and Scientific Press, 1899, vol. 78, no. 10, p. 267; Merrill and Waring, 1917, p. 534; Tucker and Sampson, 1929, p. 484; 1945, pl. 35; Sampson, 1935, p. 513.

B.S. 9/21/59.

Mastodon Mine

Location: SE $\frac{1}{4}$ sec. 14, SW $\frac{1}{4}$ sec. 13, T. 5 S., R. 11 E., S.B.M., Cottonwood Spring quadrangle, 1958; Cottonwood Mountains, Joshua Tree National Monument, about 0.8 miles southeast of Cottonwood Spring.

Ownership: Harold E. Haulsey, P.O. Box 1124, Cortez, Colorado owns 1 lode claim (March 1958).

History: In 1945 the mine was owned by George W. Hulsey (Haulsey?), Indio (Tucker and Sampson, 1945, p. 138).

Geology: At the main workings a northwest-trending and 40° NE.-dipping fault cuts White Tank quartz monzonite (fig. 1/). The fault zone contains thin iron-stained gold quartz veins. About 400 feet to the west is a northwest-trending and 60° NE.-dipping quartz vein no more than 1-foot wide.

Development: The main shaft is sunk 75 feet in a fault plane. About 400 feet west, another shaft is sunk to an unknown depth on the 1-foot wide quartz vein. It is caved at the 10-foot level. (fig. 1/). Material was hauled from the mine along a narrow dirt road to the Winona Spring (Cottonwood Spring Custom) mill. The mill had a capacity of 40 tons a day and processed material from other mines in the Pinto Basin area (Tucker and Sampson, 1945, p. 129). The mill is in ruins and the mine is idle.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 129, (and p.

138.

J.R.E. 12/11/59.

Figure 1/. Sketch map showing the location (A),
and a geologic sketch map (B), of the Mastodon mine (topo-
graphy from U.S.G.S. 15' Cottonwood Spring quadrangle,
1958).

Development: Tucker and Sampson (1945, p. 144) reported that several shafts ranging from 20 to 70 feet in depth were sunk on veins.

Two shafts, which now constitute the main workings were visited in the field. Both shafts should lie on the Desert Gold Group of claims, because they are sunk on steeply-dipping and generally north-striking faults. The shaft nearest the house (pl. 3/) is at least 100 feet deep and drifts join to it at one or more levels. It is estimated that there is a total of about 400 feet of work. The other shaft, about a tenth of a mile east and higher on the hillslope, is at least 120 feet deep and drifts join to it at one or more levels. Total work here is estimated to be about 700 feet. The mine was not in operation on the day of the property visit.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 488; Tucker and Sampson, 1945, p. 144.

J.R.E. 3/11/60,

Mc Haney Mine

See Desert Queen mine.

Meek (Thelma and Desert Gold Group) Mine

Location: Sec. 14, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 4 miles south-southeast of New Dale (Site) and 1 mile southeast of the Gold Crown mine (pl. 3/).

Ownership: H. G. Frydenlund, Box 704, Twentynine Palms, owns at least 2 unpatented lode claims (March 1958).

History: Jack Meek owned the property in 1929, and at this time had performed only exploration work consisting of a few shallow shafts sunk on different veins. (Tucker and Sampson, 1929, p. 488). Jack Meek owned and intermittently operated the mine on a small scale until his death in the early 1950's.

Geology: The Thelma Group is located on a series of generally west-striking quartz veins, ranging in thickness from 1 to 2 feet. The Desert Gold Group is located on north-trending and steeply-dipping quartz veins ranging in thickness from $\frac{1}{2}$ to 2 feet. According to Tucker and Sampson (1945, p. 144) all veins cut quartz monzonite and locally are heavily mineralized with hematite showing free gold.

Menifee Mine

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 5, T. 6 S., R. 3 W., S.B.M.,
Romoland quadrangle, 7 $\frac{1}{2}$ ', 1953; about 8 miles south of
Perris.

Ownership: Ora Rhodes, P.O. Box 915, Perris.

History: Though its date of discovery was not determined,
by 1885 the Menifee Mine was well developed and a five-stamp
mill was being constructed to avoid the continued shipment
of concentrates to San Francisco via San Diego (Mining and
Scientific Press, 1885, vol. 51, p. 120). The mine appears
to have been operated continuously through 1896 at which
time it was owned by H. N. McGready et al., Menifee
(Crawford, 1896, p. 312). In 1899 the mine was idle and
had passed into the hands of a Chicago interest (Mining
and Scientific Press, 1899, vol. 79, p. 750). U. S.
Bureau of Mines records show that in 1900 G. S. Allen,
Perris, operated the mine, followed in 1901 by W. F. Bray,
Perris and in 1903 by Morrison and Anderson, Perris. These
men may have been lessees. Tom Chaffin owned the Menifee
Mine in 1917 (Merrill and Waring, 1917, p. 533) and as
late as 1935 (Sampson, 1935, p. 513). The claim is now
part of Rhodes Ranch.

Geology: The vein is no longer exposed but according to an old report it appears to lie along a diorite-schist contact. It strikes northeast and dips 80° NW. to a depth of 40 feet below which it flattens to 65° NW. The vein was reported to range from one foot to 30 inches in thickness and to yield about \$24 per ton in gold. Traces of pyrite were reported present (Storms, 1893, p. 385). Fragments of ore on the old dump resemble the ore from near by mines in that the fragments are fractured vein quartz with coatings and pockets of iron oxides.

Development: The vein was explored through 4 shafts 0, 55, 100, and 125 feet deep from which drifting and stoping had been accomplished (Mining and Scientific Press, 1899, vol. 79, p. 750; Sampson, 1935, p. 513). At present (1959) the shafts are filled and the mine long abandoned.

Production: Compiled by the U. S. Bureau of Mines
and published with permission of the owner.

Year	Crude ore (tons)	Gold (ounces)	Recoverable metals Silver (ounces)
1900	-	29.02	282
1901	-	41.12	
1903	45	21.77	

References: Mining and Scientific Press, 1885, vol. 51
no. 7, p. 120; 1899 vol. 79, no. 27, p. 750; Storms, 1893,
p. 385; Crawford, 1896, p. 312; Merrill and Waring, 1917,
p. 533; Tucker and Sampson, 1929, p. 484; 1945, pl. 35,
no. 86; Sampson, 1935, p. 513.

R.B.S. 9/22/59.

Missing Link Mine

See Virginia Mine.

Mission (Huff-Lane) Mine

Location: Secs. 14 and 21, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 2 miles north-northeast of Mission and Sunrise Wells (pl. 3/).

Ownership: L. P. Clause, Box 85, Indio owns 7 unpatented claims and 2 mill sites (March 1958).

History: The mine was discovered by George Lane, Mecca, in 1887, and was owned by him and E. C. Huff in 1929 (Tucker and Sampson, 1929, p. 481). Apparently little work was done until the 1930's. From 1933 to 1936 the mine was owned and operated intermittently by E. C. Huff, 823, S. Bonnie Brae St., Los Angeles. The Mission Gold Mines Co., Mecca, owned and intermittently operated the mine from 1939 to 1942. The present owner, representing the Mission Mining Co., operated the mine in 1951 and 1955.

Geology: Massive quartz monzonite is cut by a series of semi-parallel quartz veins containing pyrite, chalcopyrite, hematite, gold, and secondary copper and iron minerals. The other principal vein is known as the Water Well ; Verde and Lone Star respectively. The Water Well vein has been the most extensively worked.

It strikes N. 20° W., dips 75° - 80° E., is 2 feet in average width, and has a proven surface length of 3000 feet (Tucker 1934, unpublished Field Report No. 124). The Lone Star and Verde Veins are of undetermined extent.

In 1934 the Verde shaft was reported to be 350 feet deep, and the Lone Star shaft 50 to 70 feet deep (Tucker 1934, unpublished Field Report No. 124). During certain periods of time in the 1930's and early 1940's it is probable that ore was milled at the Sunrise Mine (Mission) mill about 2 miles south of the mine (pl. 3/). Certainly ore was milled here in 1951 and 1955. Neither the mine or the mill was in operation on the day of the property visit.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude Ore (tons)	Gold (oz.)	Silver (oz.)	Copper (lbs.)
1933	20	11	7	
1934	132	33	6	
1936	100	36	7	
1939	189	187		
1941	632	568		
1942	213	277	158	589
1951	122	26	16	
¹⁹⁵⁵ 1952	10	3		

References: Tucker and Sampson, 1929, pp. 481-482; Tucker, 1934, unpublished Field Report No. 124; Tucker and Sampson, 1945, p. 139.

J.R.E. 3/8/60.

Development: Work began on the Water Well Vein in 1931 and by 1946 a 600-foot shaft had been sunk. On the 125-foot level a drift is driven 533 feet north and 191 feet south. At a point 388 feet from the shaft along the north drift, there is a 120-foot raise on the vein to the surface. These workings developed an ore shoot 2 feet wide and 60 feet long, and ore milled from a stope in this shoot was reported by Tucker and Sampson (1945, p. 139) to have had an average value of \$25 per ton in gold. Other work consists of drifts driven north 100 feet, south 120 feet on the 400-foot level; north 325 feet, south 100 feet, on the 600-foot level. The 325-foot north drift was driven to develop an ore shoot 2 feet wide and 200 feet long. Four shipments of ore from this shoot to the Gold Crown Mining Company mill are reported to have averaged \$43 per ton in gold (Tucker and Sampson, 1945, p. 139).

Mission Sweet Mine

Location: Sec. 34², T. 3 S., R. 13 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Eagle Mountains, about 3 miles southwest of the Black Eagle mine and $9\frac{1}{2}$ miles northeast of the East Pinto Basin-West Pinto Basin-Cottonwood Pass and Black eagle mine roads intersection.

Ownership: Undetermined.

History: Undetermined.

Geology: Hornblende granite is cut by several minor north-trending and steeply-dipping faults that contain gold-bearing quartz veins and stringers. The veins are thin and discontinuous; the thickest one observed was about 8 inches. The hornblende granite is intrusive into old sedimentary rocks, and near the top of a hill about 0.2 of a mile northeast of the principal development work it is intrusive into calcitic dolomite. No mineralization was observed in the short adit driven into the contact zone.

Development: The principal workings consist of a few shallow shafts with short drifts. The deepest shaft observed was sunk only 13 feet, with 20-foot drifts driven north and south at the 18-foot level in a fault plane. The mine is at an elevation of about 2200 feet and is idle.

Production: Undetermined.

References: None.

J.R.E. 3/17/60

Model (Chuckwalla and Model) Mine

Location: Sec. 2, T. 7 S., R. 14 E., (proj.), S.B.M., Chuckwalla Mountains quadrangle, 15', 1945. The Model mine is reached by about 7½ miles of dirt road extending south of U.S. Highways 60 and 70 from a point 9 miles west of Desert Center.

Ownership: William R. McGowen, Box 461, Desert Center (1959).

History: This property was described as the Chuckwalla and Model group of mines by Tucker and Sampson (1945, p. 129). Fifteen claims were then held by Mrs. A. R. Enloe, Los Angeles, and Leslie Waldrip, Indio. U.S. Bureau of Mines records show that this mine's best years were in 1902 and during the thirties. The most recent activity was in 1947 to 1949 (Personal communication, Wm. R. McGowen, March 30, 1959) but no record of production was found for that period.

Geology: A fault zone as much as 3 feet wide is exposed for about 200 feet along the north slope of a low granite ridge. It strikes N. 40° E. and dips 70° NW. Irregular bodies of crushed vein quartz lie along the fault zone and reach a maximum thickness of one foot. Both the vein matter and the enclosing gouge and wall rock are stained and veined with iron oxides. The fault appears to split, forming two distinct zones through the southwestern half of its exposed length.

Development: The fault is explored by a 50-foot inclined shaft and several trenches 20 to 50 feet long and as much as 10 feet deep. Because no copper or lead minerals were noted in these developments, and those metals are reported from this mine, it is probable that undescribed mine openings are present on other claims of this group.

Production: Compiled by the U.S. Bureau of Mines
and published by permission of the owner.

Recoverable Metals

Year	Crude ore	Gold (ounces)	Silver (ounces)	Copper (pounds)	Lead (pounds)
1902	150	72.57			
1934	64	56.40	208	311	1,270
1935	46	25.82	85	179	1,465
1936	10	2.57	1		
1940	75	21	14		
1941	20	25			
1946	3	3	3		

References: Tucker and Sampson, 1945, p. 129; Goodwin
1957, p. 601.

R.B.S. 4/30/59

Moose Mine

Location: Sec. ^S11 and 12, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about 4 miles north of Mission and Sunrise Wells and 2 miles east of the Gold Crown mine (pl. 3/).

Ownership: Walt Rose, General Delivery, Twentynine Palms, owns at least 1 unpatented claim (March 1960).

History: The Moose Mine is one of the 3 mines owned and operated by Sunrise Mines Inc., San Diego, in the 1930's. In 1933 the property consisted of the Moose Group of 3 claims (Tucker 1933, unpublished Field Report No. 121). Willard H. Allen owned and operated the mine in 1939. Earl Geiger owned and operated the mine in 1941 and 1942 (see Sunrise mine description).

Geology: A north-trending and 63° W.-dipping fault cuts quartz monzonite, and contains a gold-quartz vein 6 feet in average width (Tucker, 1933, unpublished Field Report No. 121).

Development: The main workings consist of an inclined shaft sunk 203 feet in the fault plane. There is a 50-foot drift driven north, and a 90-foot drift driven south, on the 70-foot level to develop the 70-foot ore shoot. At the shaft collar level a drift adit is driven south on the vein about 90 feet. A lower adit is driven south 200 feet on the vein. The mine is worked intermittently by the present owner.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude ore (tons)	Gold (oz.)	Silver (oz.)
1932	100	58	23
1939	3	1	
1941	75	32	7
1942	75	35	15

References: Tucker, 1933, unpublished Field Report No. 121.

J.R.E.

Monarch Mine

See Tubbs Claims (tungsten-gold).

Morning Star Mine

Location: Sec. 32 (proj.), T. 6 S., R. 16 E., S.B.M., U. S. Army Corps of Engineers Chuckwalla Mountains quadrangle, 15', 1945; about 1½ miles southwest of Corn Spring and 7 miles southeast of Desert Center.

Ownership: Undetermined (1959).

History: This mine was worked in the late 1920's by the Morning Star Mining Company (Tucker and Sampson, 1929, p. 485).

Geology: The Morning Star mine explores a mineralized aplite dike which strikes N. 35° E., along the east slope of a granite ridge. The dike is about 6 feet wide and vertical. It is one of a system of brown-weathering, generally porphyritic dikes of granitic composition in the north-central part of the Chuckwalla Mountains. These dikes are usually barren. They have been identified as quartz latite porphyry (Miller, 1944, p. 20, 65).

The dike on the Morning Star claims appears to have been shattered, and the resulting boxwork of fissures filled by quartz and pyrite. The pyrite has altered to oxides of iron. Free-milling gold was observed in a specimen of the dike but no assay data ^{were} ~~ever~~ found.

Development: A 50-foot shaft was sunk on the dike. About 500 feet down the slope to the northeast a 160-foot adit was driven northwest to cross-cut the dike, but work was suspended before the dike was reached.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 485; Miller, 1944, p. 20.65.

R.B.S. 3/13/59.

Morning Star (Jackknife, Morgan) Mine

Location: This group of seven claims is in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 6, T. 2 S., R. 24 E., and SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 31, T. 1 S., R. 24 E., S.B.M., Vidal quadrangle, 1950; 6 miles south of Vidal in a high valley about half a mile southwest of the Mountaineer Mine and accessible by trail from that property (fig. ___/).

Ownership: Benjamin M. Stansbury, P.O. Box 315, La Canada (1960).

History: According to Jack Stewart, a resident of Parker, Arizona, the Morning Star used to be known as the Morgan claims. Though no record of activity was found under that name, a report on the old Jackknife claims was included in the Fifteenth Report of the State Mineralogist in which Cal Morgan and H. D. Bradley are given as owners (Merrill and Waring, 1917, p. 83). In 1929 it was reported (Tucker and Sampson, 1929, p. 482) that C. W. Mitchell, Parker House, Boston, Massachusetts had acquired the Jackknife along with the Calzona and Steece properties. The name Morning Star was used by the Morning Star Mining Co. which held the property in 1945 (Tucker and Sampson, p. 139). There appears to have been little activity since that date.

Geology: The rocks of the area are limestone, dolomite and gypsum interbedded with schists. They strike N. 50° - 60° E., dip 45° - 50° NW. and are cut by a system of northeast-trending, low-angle faults and shear zones and northwest-trending high-angle faults. The valley trends northeastward along the strike of the rocks. A contorted gypsum unit as much as 100 feet in thickness crops out along the valley floor and the base of the northwest slope. Faulting and shearing appear to have occurred roughly parallel to, and in part within, this unit. At the northeast end of the valley this shear zone is crossed by a northwest-trending fault. Mineralization is extensive in and about the junction of the fault and the shearing forming an ore shoot which plunges 30° to the northwest (fig. ___). Gold occurs in a gangue composed of iron and manganese oxides, limestone, schist, barite, secondary copper minerals, and quartz. The copper minerals are chrysocolla and malachite. The ore is in pockets, veins, and zones of fault breccia.

Development: A 100-foot vertical shaft was sunk on the northwest-trending fault. At the 60-foot level a raise was driven S. 80° E. at about 30°. The raise explores a tabular ore body, reported to have been as much as 6 feet in thickness (Tucker and Sampson, 1945, p. 139). The ore body strikes N. 80° E. and dips 35° NW. It appears to lie parallel to the bedding of the country rock. The raise is about 100 feet long and was broadened, by irregular stoping, to a maximum width of about 30 feet (fig. ___/). At its upper limit the raise opens to the foot of a 30-foot shaft from the surface. At the foot of the raise a 15-foot drift was driven N. 50° W. and a 40-foot drift S. 50° E., on the fault, from a chambered area adjoining the 100-foot shaft. The upper limit of the ore is exposed in shallow working on the southeast side of the valley about 100 feet northeast of the main shaft (fig. ___/). Here it occupies a 3 to 4 foot-thick breccia zone. As exposed in the workings the lower terminus of the ore is at the vertical fault although thin stringers lie in the fault zone. It is possible that the mineralized zone extends southwest of the fault at a lower level but the lower 40 feet of the main shaft shows no proof of this.

Development consists of an inclined shaft 160 feet long along which stoping was done, and a vertical shaft sunk to and through the inclined workings. The vertical shaft is 160 feet deep, the lowest 30 feet in ore which assayed \$14 to \$19 per ton in gold and 12 to 14 percent copper. These 2 shafts are in the plane of the northwest-trending fault.

When visited in 1957 all former buildings and the head frame of the vertical shaft had been destroyed by fire. The mine was revisited in April, 1961 by which date a new head frame, collar and ladder had been installed on the main shaft. Remains of a tramway still stand on saddles to the northeast along the trail to the Mountaineer.

Production: By 1932 an estimated \$100,000 in ore averaging \$60 per ton in gold and copper had been taken from these claims. At that time a contract was made with the American Smelting and Refining Company whereby their Hayden, Arizona plant was to purchase ore at a maximum smelting rate of \$4 per ton with no penalties due to the fact that the ore made a favorable smelting mixture (Mitchell, unpublished report 1932). Records of production since 1932 were not found and whether any ore was delivered to Hayden under the ¹⁹³² contract is not known.

References: Merrill and Waring, 1917, p. 543; Tucker and Sampson, 1929, p. 482; 1945, p. 139; Mitchell, 1932. R.B.S. and C.H.G. 12/19/57.

R.B.S. 4/20/61.

Morning Star Mining Company

See Morning Star Mine.

Morgan Claims

See Morning Star Mine.

Morris Washington Deposit

Location: $8\frac{1}{2}$ sec. 22, T. 4 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, ^{7.5}1953. The deposit is part
of an elongate hill of diorite on the Morris Washington
Ranch, about 3 miles northwest of Perris.

Ownership: Undetermined.

History: Undetermined.

Geology: A pegmatite dike as much as 3 feet wide is
exposed on the southeast slope of the hill. It strikes
north and dips 30° W. Milky- to vitreous quartz is
the chief constituent of the dike; the other components,
feldspar and biotite mica, are localized in pockets
and along the margins of the body. The dike is fractured
and in an irregular central zone the fissures and
cavities are filled with oxides of iron. Some of the
stains resemble altered, lath-shaped biotite crystals.

A post-dike system of fractures and faults
strikes N. 20° - 30° W., and dips 70° - 75° SW., cutting
the country rock and the dike. These breaks range from
fissures a fraction of an inch wide up to shear zones 20
feet in width; mineralizing solutions have filled them
with granular calcium carbonate. Where such fissures
cross crushed parts of the dike the voids and fractures
in the dike are similarly mineralized.

The presence or percentage of gold, or other precious metals in the deposit, was not determined.

Development: The principal workings are a 30-foot shaft inclined 30° W. and a partially caved drift adit about ¹⁰~~ten~~ feet long which terminates at the collar of a second shaft of undetermined but probably shallow depth. These two openings are about 10 feet apart in the face of a cut on the east slope of the hill. They explore the pegmatite dike.

Two open-cuts, one on the northwest slope and one on the south slope, explore northwest-striking faults. The one on the northwest slope follows a shear zone 20 feet wide which contains veins and lenses of calcium carbonate as much as 3 feet wide. The south cut explores a shear zone about 6 feet wide. Pegmatite dikes with a maximum width of 2 inches are exposed in the cut. Here carbonate veins a fraction of an inch wide form a coarse boxwork in the deeply weathered country rock. A 10-foot drift extends beyond the face of the cut and terminates at a 5-foot winze.

Production: Undetermined.

References: None.

R.B.S. 6/16/59.

Moser (Gold Flake (?), Patches (?)) Claims

Location: E $\frac{1}{2}$ sec. 20 (proj.), and SW $\frac{1}{4}$ sec. 21,
T. 2 S., R. 16 E., S.B.M., Coxcomb Mountains quadrangle,
1945; on the northeast slope of a northwest-trending
ridge about 2 $\frac{1}{2}$ miles northwest of siphon #86 of the
Colorado River Aqueduct.

Ownership: Five contiguous,unpatented, claims, Leo,
Maxie, Jenny, Moser and Bamby are held by Carl Moser,
1732 W. Rosecrans, Gardena and Edward Severson, general
delivery, Yucca Valley. Mr. Moser holds the Leo, Maxie and
Bamby claims and a half interest in the Jenny and Moser.
Mr. Severson holds half interest in the Jenny and Moser
Claims and leases Moser's half interest.

History: This deposit is probably the site of the old Gold Flake and Patches claims which appear to be mislocated on the 1945 map (Tucker and Sampson, 1945, pl. 35). The history of those claims is unknown. Mr. Moser first held the property in 1944.

Geology: The Moser Claims are in an area underlain by granodiorite and complexly intruded by dikes of metamorphic rocks. Quartz veins ranging from several inches to as much as 5 feet in thickness are unevenly exposed for about 7,000 feet. The veins strike N. 40° W. and dip from 65° SW. to about 85° NE. They lie in the planes of a system of faults along which movement has recurred since the ^{ir} deposition. ~~(of the veins)~~ The vein quartz is strongly fractured and the contained metal-bearing minerals largely altered by meteoric water the circulation of which was no doubt aided by additional fracture planes in the country rock. The vein contains irregular masses of pyrite, iron oxides, calcite, and, locally, stains and thin crusts of copper carbonates. Galena is present but is largely altered to earthy cerussite and anglesite. The gold is free milling and is most abundant in concentrations of lead minerals. Silver is present in the galena and possibly in unidentified secondary minerals.

Development: When visited in 1962 development was proceeding on the Jenny and Moser Claims and preparations were being made to develop the Leo claim. On the Jenny an inclined shaft had been sunk about 130 feet on the vein. About 110 vertical feet down the slope a crosscut adit extends 200 feet southwest to the vein. From the adit face a drift was run 50 feet northwest on the vein and joins with the inclined shaft about 20 feet northwest of the adit. Another drift, being driven southeast on the vein, has been carried a distance of 600 feet, well on to the Moser claim. In this southeast drift it is hoped to cross a downward extension of rich ore found in the outcrop.

The former owners worked the deposit through several shallow prospects and short adits to the southeast of the present (1962) development.

On the Leo Claim there is an old shaft 20 feet deep at the bottom of which is a 12-foot cross-cut, and an open cut just southeast of the shaft. In addition new work is planned by Carl Moser about 400 feet northwest. An ore chute is exposed in a prospect and an adit now (1962) 40 feet long, is to be driven northwest, from a point about 250 feet down slope from the exposed ore, to explore its downward extent.

Production: No sustained production has yet been reported from these claims. In 1947 and 1948 a total of 18 tons of ore were shipped for smelting. According to the owner, this ore yielded \$125 per ton in gold and silver.

References: Tucker and Sampson, 1945, pl. 35.

R.B.S. 11/17/59.

Mountaineer (Calzona) Mine

Location: S $\frac{1}{2}$ sec. 31, T. 1 S., R. 24 E., S.B.M., Parker Quadrangle, 1950; on the east slope of the River-side Mountains, 36 miles north of Blythe.

Ownership: Hugh Gordon, 727 West 7th Street, Suite 7, Los Angeles.

History: This group of claims was owned and worked by Calzona Mines Company from 1898 to 1920 (Merrill and Waring, 1917, p. 542-543). In 1920 the property was acquired by Mountaineer Mining Company who held it until October 1935. In 1935 a 50-ton flotation plant was installed on the property. Water for operating the mine and mill was pumped 1 $\frac{1}{2}$ miles from the Colorado River (Tucker and Sampson, 1945, p. 140). Early in 1960 the property was leased and worked briefly by Figueroa Mines, P.O. Box 453, Blythe, who shipped a 21-ton lot of select ore to American Smelting and Refining Co., Hayden, Arizona.

Geology: The country rock is sheared and contorted limestone, dolomite, and schist which strike northeast and dip 40°-50° NW. The mine explores a mineralized zone at and near the junction of two faults (fig. ___/). One fault is parallel to the bedding of the country rock and is exposed on the southeast side of a narrow, northeast trending canyon. The other fault strikes N. 25° W., dips from vertical to steeply northeast and is exposed on both sides of the canyon.

Development: The mine has been worked from a drift adit (the west adit) driven 150 feet northwest into the northwest side of the canyon on the northwest trending fault and a 150-foot shaft inclined 50° northwest on the fault junction, driven from low on the southeast side of the canyon. A manway was sunk from the collar of the shaft to a point 30 feet southwest of the shaft at the 80-foot level and the two were connected by a drift. The manway appears to follow a barren shear zone which might be the same fault as that extending northeast of the junction. At about the 115-foot level a short drift was driven northeast from which a winze was sunk, at about 40°, which crosses above the shaft to a gallery just above its base. From the base of the shaft a gallery was driven northeast into ore which was stoped from the gallery and explored through a 65-foot winze. A 190-foot drift extends northwest from the base of the shaft. A raise connects the drift to the northwest adit and an additional raise extends from the adit to the surface. An undetermined amount of stoping was done adjacent to the raises. Figure _____ shows the principal features of the mine and orientation of the workings on the faults.

Gold occurs in a gangue of quartz, barite, chalcopyrite, malachite, chrysocolla, and oxides of iron and manganese. The ore forms irregular lenticular bodies ranging from 0 to 10 feet in thickness and a few tens of feet in lateral and vertical extent. The ore bodies appear to have formed both by fissure filling and replacement. One of the two principal ore bodies was encountered at the 150-foot level. It is a mass of altered and mineralized country rock, as much as 10 feet in thickness and of undetermined lateral extent, lying on the fault parallel to the bedding of the country rock and extending northeastward from the junction of the two faults. The other ore body was discovered on the northwest trending fault between the 150-foot level and the northwest adit (fig. ___/). The thickness and extent of this body was not determined, the workings being inaccessible.

The Mountaineer mine has been examined as a prospective source of manganese but no manganese production has been reported (Wilson, 1943, p. 184). Samples of Mn oxides, taken from the Mountaineer and the neighboring Morning Star mines, are reported (personal communication, Danny G. Figueroa) to contain as much as \$19 per ton in gold.

Production: Compiled by the U.S. Bureau of mines and published with permission of the owner.

Year	Crude ore (tons)	Gold (ounces)	Silver (cunces)	Copper (pounds)
1915	50	92.01	10	7,656
1916	46	28.69		4,050
1934	1,495	81.35	12	
1935	(45 (12 concentrates)	80.48		1,273

The 21-tons of ore shipped in 1960 yielded \$62.70 in gold (@ \$32.3185 per ounce) and \$32.34 in copper (@ \$0.30725 per pound) per ton.

References: Merrill and Waring, 1917, p. 542-543;
Tucker and Sampson, 1929, p. 477; Wilson, 1943, p. 184;
Tucker and Sampson, 1945, p. 140, pl. 35).
R.B.S. 4/20/61.

Mystery (Mirtry) Mine

Location: Sec. 15?, T. 2 S., R. 13 E., S.B.M. (proj.),
U. S. Army Corps of Engineers Eagle Tank quadrangle, 15',
at the base of the north slope of the Eagle Mountains,
Joshua Tree National Monument, about 6 miles southeast
of Mission Well. Not confirmed, January 1960.

Ownership: Undetermined, 1960.

History: A small scale gold placer operation, carried
on from 1933 to 1936 when L. L. Benthall, Indio owned the
project.

Geology: Alluvium was processed by placer methods for
gold.

Development: Undetermined, but was reported to be a
small scale hand operation (U. S. Bureau of Mines records).

Production: Compiled by the U. S. Bureau of Mines.

Year	Yardage handled	Gold ounces
1933	185	9
1934	250	6
1935	500	13
1936	100	4

References: None.

J.R.E.

New El Dorado (El Dorado) Mine

Location: Secs. 16 and 17, T. 3 S., R. 10 E., S.B.M.
(proj.), U. S. Army Corps of Engineers Pinkham Well quad-
rangle, 15', 1943; Hexie Mountains, Joshua Tree National
Monument about 5 miles southeast of White Tank, and

March 3rd, 1965

NEW EL DORADO MINE

Section 8 & 17, Township 3 south, Range 10 east, S.B.M.

The last owner of this mine was John McEnnis, 15461 Del Grado Dr.,
Sherman Oaks, California.

He quit-claimed to the State of California. "New El Dorado Mining
Company" ---number 14-15 ----sale number 3414 ---Instrument number
94 ---dated 12/64.

Geology: A major fault striking N. 20° W. and dipping 76° E. cuts the Pinto gneiss which here has been carved into an elongate east-trending ridge (fig. 1/). Oxidized milky vein quartz, as much as 4 feet thick, mineralized with gold, silver, and galena occurs along the fault.

Development: At least 2,000 feet of drifts, shafts and minor crosscuts have been worked in and adjacent to the plane of the fault. The main shaft is inaccessible below the 90-foot level which contains about 800 feet of drifts and minor crosscuts (fig. 1/). A non-distinct jeep road leads west about 5 miles from the mine, into the Pleasant Valley, and then southeast about 4 miles to the Pinyon Well millsite. The mine is idle.

Production: Compiled by the U. S. Bureau of Mines and

published with permission of the owners.

Year	Crude ore (tons)	Gold (ounces)	Recoverable Metals	
			Silver (ounces)	Lead (pounds)
1911	18	9	4	
1912	53	22	7	
1913	739	564	147	
1914	1,033	464	119	
1915	1,072	331	73	
1916	549	172	29	
1930	260	83	18	
1931	3	4	10	2,041
1935	200	30	9	
1936	400	108	23	
1937	1,000	190	121	
1938	75	30	31	

The "Eldorado (New Eldorado) mine" has been described (Brown, 1923, p. 266) as a source of vanadium, the ore mineral being vanadanite, but no formal report of production appears to have been made.

References: Brown, 1923, p. 266; Tucker and Sampson, 1929, p. 485.

J.R.E. 12/9/59

Figure 1/. Plat of the lode claims and mill-site of the New Eldorado Mining Company (Survey No. 5601- A-B; surveyed October 25-30, 1921; patent no. 919797 issued October 10, 1923).

Figure 2/. Sketch map showing the location (A);
on ~~the~~ the 90-foot level (B);
and ~~geologic sketches~~ of the New El Dorado mine
(Topography from U.S.A.C.E. 15' Pinkham Well quadrangle,
1943).

New Eldorado (Pinyon Well) Millsite

Location: N $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 24, T. 3 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree
National Monument, on the south side of Pushawalla
Canyon trail at the east margin of the Little San
Bernardino Mountains.

Ownership: Fred Vaile, Los Angeles (1929). Undeter-
mined (1960).

History: Pinyon Well was the only water supply for
mines operated at different times in this region in the
1890's. In 1895 ore from the Desert Queen mine is
reported to have been milled here in a 2-stamp mill
(W. F. Keys, oral communication January 1960). In 1918
the wreck of a 2-stamp mill, 2 deserted cabins, several
abandoned shafts, and 2 wells marked the spot (Brown,
1923, p. 267). In 1921 the New Eldorado millsite of
4.13 acres was located at Pinyon Wells. Patent was
issued in 1923 and the wells supplied water through a
pipe line to the El Dorado Mine, about 9 miles east,
in the 1920's. The wells have not been used for many
years, probably not since the Eldorado mine closed in
the late 1930's.

Production: During its two principal periods of development, 1911 to 1916, and 1930 to 1938, the New Eldorado Mine yielded a total of some 5,400 tons of ore from which about 2,000 ounces of gold, 600 ounces of silver, and 2,000 pounds of lead were recovered.

The "Eldorado (New Eldorado) mine" has been described (Brown, 1923, p. 266) as a source of vanadium, the ore mineral being vanadinite, but no formal report of production appears to have been made.

References: Brown, 1923, p. 266; Tucker and Sampson, 1929, p. 485; Goodwin, 1957, p. 605.

J.R.E. 12/9/59

Development: All mine workings are in the fault zone and have exposed it nearly continuously along a north-south line for a distance of 660 feet (fig. 1/). The uppermost shaft is sunk 20 feet vertically ⁱⁿ on a gouge zone 1-foot thick. About 140 feet south another shaft is sunk 25 feet vertically. A trench, from 0-6 feet deep, extends north about 80 feet from this shaft. Approximately 80 feet further south is a 7-foot deep trench, 55 feet long ending in a burrow-like adit that opens south and extends inward 15 feet. About 165 feet south of the mouth of the burrow an adit is driven north at least 140 feet. A raise is driven to the surface 135 feet from the portal. It opens a few tens of feet down-slope from the burrow. Next in sequence, 110 feet south, is an adit driven 250 feet N. 5° W. (fig. 1/). About 110 feet south of lower adit, is what appears to be the discovery shaft. It is the most ancient of all workings and is sunk vertically at least 50 feet. The mine is idle.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 472; Tucker and Sampson, 1945, p. 140.

J.R.E. 2/10/59.

Figure 1.. Map showing the workings of the North Star mine and a geologic sketch map of the lower adit level (topography from U.S.G.S. 15' Valley Mountain quadrangle).

NEW Hemet Belle Mine

See Hemet Belle Mine.

North Star (Sunset) Mine

Location: Sec. 14, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 2½ miles north of Mission and Sunrise Wells (pl. 3/).

Ownership: Mr. Ross and Mr. Carpenter, 4401 Keystone Ave., Culver City, own at least one unpatented claim (March 1960).

History: Undetermined.

Geology: Massive quartz monzonite is cut by a north-trending vertical fault containing quartz veins as much as 6 inches wide.

Development: A vertical shaft is sunk 100 feet in the plane of the fault. The mine is worked intermittently by the owners.

Production: Undetermined.

References: None.

J.R.E. 3/9/60,

North Star Mine

Location: NE $\frac{1}{4}$ sec. 6, T. 2 S., R. 10 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, about 8.3 miles S. 30° E. from Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: The North Star mine was originally located as the Atlanta, and in 1920 was owned by the Gold Park Consolidated Mines Company, W. C. Winnie, president, J. E. Schweng, secretary, C. W. Roach, manager; Offices 1021 Black Building, Los Angeles. By 1929 J. Klugh of Pasadena owned the mine and it was known as the North Star Group (Tucker and Sampson, 1929, p. 472). By 1945 the property was owned by Floyd Mining and Milling Company, Earl F. Skadan, president; G. C. Zimmerman, secretary, Norco (Tucker and Sampson, 1945, p. 140).

Geology: Mine workings are in a north-trending, nearly vertical fault zone which cuts the Pinto gneiss. The gneiss is cut by: an irregular body of medium-grained hornblende granite, aplite dikes, fine-grained green basic dikes and dikelets, and tabular veins of milky quartz. Veins are post-faulting and are strongest where fluids have crossed zones of weakness. Accordingly, the quartz veins are as much as 2 feet thick in the fault zone. The quartz veins contain disseminated grains of yellow pyrite, altering to limonite, and possibly contain ~~(quartz)~~ gold.

Northern Belle Mine

See Santa Rosa.

Nuisance Group

Location: NE $\frac{1}{4}$ sec. 12, T. 2 S., R. 9 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park area, 9.4 miles S. 25° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Virginia Downs filed on the property November 1, 1955.

Geology: Pegmatite dikes, fine-grained green basic dikes as much as 2 feet thick and thin veins of gold (?) bearing quartz occur in the Pinto gneiss. They are strongest along, and in the plane of a north-trending, 71° west-dipping fault (fig. 1/).

Development: An inclined but partly caved shaft has been sunk to an undeterminable depth in the plane of the fault. The shaft is in the central part of a shallow open cut which is in the north part of a larger roughly circular open-cut that leads into the portal of an adit. The adit has been driven south about 40 feet in the fault plane (fig. 1/).

Production: Undetermined.

References: None.

J.R.E. 3/20/59.

Figure 1/. Geologic sketch map of the
Nuisance group.

Cehl Placer Claim

Location: Sec. 1, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about 3/10 mile south of the Rose of Peru mine and 4½ miles northeast of Mission and Sunrise Wells (see pl. 3/).

Ownership: Bonnie H. and Dean H. Cehl, 77 E. 9th Ave., San Bernardino own 1 unpatented claim.

History: The mine was discovered and worked in the 1930's. No work has been done in recent years.

Geology: The mine is in a low mound of older alluvium composed of clasts ranging in size from boulder to silt. A few tens of yards to the north the alluvium thins and feathers out on quartz monzonite. Because of the subordinate amount of fine grained matrix the deposit would appear to be a poor source of gold.

Development: The principal work consists of a 70-foot burrow-like adit driven north and west into the small hill of fairly well indurated older alluvium. Several tens of yards to the southeast a shaft is sunk vertically about in a 20 feet/relatively flat surface of the alluvium.

Production: Undetermined.

References: None.

J.R.E. 3/8/60

NOT ON COMB MAP

Ohio Claims

Location: NE $\frac{1}{4}$ sec. 1, T. 2 S., R. 22 E., S.B.M.,
Vidal quadrangle, 1950; at the southeast edge of the
West Riverside Mountains near Riverside Pass.

Ownership: R. F. Boyd and A. Geiger, Vidal (1958).

History: Undetermined.

Geology: The rocks on these claims are gneisses cut
by pegmatite dikes and quartz veins. *gneissic
plutonics? MWS - 11-24-78*

Development: A single inclined shaft of unascertained
but probably shallow depth explores a poorly exposed
pegmatite dike, the thickness of which is obscured by
shearing. The approximate attitude of the dike is
N. 45° E., 70° SE. It is composed of quartz, microcline,
chlorite, calcite, and hematite.

No equipment remains at the site. The shaft is
open and dry but access is difficult. This appears to
have been a small operation.

Production: Undetermined.

References: None.

R.B.S. 2/18/58.

↓
NEXT TO
POST-1958
POWER LINE
ROAD - 11-24-1978
MWS

Old Channel Claim

See Chuckwalla Spring Placers.

Ophir Mine

See Lucky Strike Mine.

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Oro Copio Mine

Location: Reported to be in sec. 6, T. 2 S., R. 10 E., and sec. 12, T. 2 S., R. 9 E., S.B.M. (proj.); about 9½ miles southeast of Twentynine Palms in the Pinto Mountains, Gold Park area, by Tucker and Sampson, 1929, p. 486. Not confirmed 1959. This mine may include part or all of the mine workings ascribed herein to the Gold Park Consolidated (?) gold mine #5.

Ownership: Undetermined.

History: The mine was apparently active in 1921 and was owned by the Gold Park Consolidated Mines Company (Tucker, 1921, p. 348). By 1929 the mine was idle (owner, Ellsworth Nichols, Santa Ana) but between 1921 and 1929 additional work was done (Tucker and Sampson, 1929, p. 486).

Geology: Narrow quartz veins, striking N. 10° E., follow a shear zone in granite, which is here altered to gneiss (Tucker, 1921, p. 348).

Development: Three shafts, 50, 75, and 100 feet respectively are sunk on the quartz veins (Tucker and Sampson, 1929, p. 486).

Production: Undetermined.

References: Tucker, 1921, p. 348; Tucker and Sampson, 1929, p. 486.

Outlaw Mine

Location: Sec. 1 (?), T. 2 S., R. 13 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, Joshua Tree National Monument, about 9 miles northeast of Sunrise Well, and $2\frac{1}{2}$ miles northeast of the Zulu Queen mine.

Ownership: Undetermined.

History: The Outlaw mine may have been part of the holdings of the Sunrise Mines Inc., San Diego. Several mines in the eastern and northern part of the Pinto Basin were operated by this company in the 1930's (see the Sunrise mine description).

Geology: The mine is on top of a small outlying hill which is on the northeast side of a southeast-trending wash that drains the Pinto Mountains from the north. The hill is carved in quartz monzonite cut by a major N. 50° W.-trending and 70° NE.-dipping fault. A zone of crumbled and red-stained altered rock about 20 feet in average thickness marks the fault trace and is well exposed on the surface over several tens of feet. Locally the fault zone contains thin, discontinuous, and highly oxidized quartz veins.

Development: A shaft is estimated to be sunk at least 100 feet in the altered zone. For 35 feet the shaft is at an inclination of 70° westward but below this it begins to shallow. Water was obtained at Sunrise Well about 9 miles southwest. The dirt road which connects the well with the mine, and also the Zulu Queen mine, is in part good, but generally in very poor condition; especially that part from the Zulu Queen mine turnoff to the Outlaw mine.

Production: Undetermined.

References: None.

J.R.E. 3/10/60.

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Patches Claim

See Moser Claims.

Paymaster Mine

See Black Warrior Mine.

Mountain Queen Mine

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 7, T. 2 S., R. 20 E., S.B.M., Rice quadrangle, 1954; on the east slope of the Arica Mountains.

Ownership: Undetermined (1958).

History: This property was located (date unknown) as the Juanita No. 5, however, U. S. Bureau of Mines records show that in 1938 it was called the Mountain Queen. The owner at that time was H. C. Wiley, Rice. By 1945 it had become one of the Lum Gray claims (Tucker and Sampson, 1945, p. 139-140).

Geology: The Mountain Queen mine explores 2 gold-bearing shear zones in a homoclinal section of schists and carbonates exposed on the east slope of the Arica Mountains. In the mine area, the bedding and schistosity strike N. 60° W. and dip 50° SW. One shear zone is exposed high on the slope for a distance of about 500 feet. It has a dip and strike close to that of the country rocks. This zone is roughly 3 feet wide and is mineralized with lenses, pods, and veins of iron-stained quartz as much as one foot in thickness. The other shear zone is about 1,000 feet to the northeast and roughly 100 feet lower on the slope. It strikes N. 20° E., dips 55° northwest, and contains a fractured quartz vein as much as 6 feet wide.

The quartz of both shear zones is stained and pocketed with oxides of iron and manganese and traces of malachite.

Development: The upper shear zone was developed from 2 drift adits entering opposite sides of the ridge. One adit was driven S. 50° E. for an undetermined distance. The other adit enters the south slope of the ridge and trends N. 65° W. In 1945 this adit was reported to be 100 feet long and from it a winze descends at an inclination of 50° to 200 feet (Tucker and Sampson, 1945, p. 139-140). It might connect with the other adit through underground workings, but this was not proven. Within the first hundred feet of the portal the vein was stoped to the surface. The stopes were timbered with stulls but the adits are untimbered.

Development on the lower shear zone consists of a 30-foot vertical shaft and 2 shafts, about 200 feet apart, inclined on the dip of the vein. One of the inclined shafts is 25 feet deep--the other of undetermined depth.

Production: According to U. S. Bureau of Mines records, (published with permission of the owner) in 1938 this mine yielded 187 tons of ore from which 74 ounces of gold and one ounce of silver were recovered.

References: Tucker and Sampson, 1945, p. 139-140.
R.B.S. 4/11/58.

Peggy Mine

See Corona Mine.

Pilot Mine

See Triangle.

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Gold

Pinto (Calidonia) Mine

Location: NE $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, 8.4 miles S. 27° E. of Four Corners, Twentynine Palms (see pl. 1).

Ownership: Undetermined.

History: In 1918 the mine was owned and operated by the Gold Park Consolidated Mines Company, W. C. Winnie, president, J. E. Schweng, secretary, C. W. Roach, manager; offices 1021 Black Building, Los Angeles (Tucker and Huguenia, 1918, p. 1).

Geology: Hornblende granite, locally ^{cross-cut} ~~cross-cut~~ with thin stringers of epidote, intrudes the Pinto gneiss. The area is much faulted and a majority of the workings are in a north-trending and steeply west-dipping fault zone (fig. 1). Both the gneiss and the granite are cut by gold (?) bearing milky quartz veins as much as 3 feet wide; strongest along the pre-existing planes of weakness.

Development: Five shafts, one 45 feet deep, have been sunk (fig. 1/). Four of these are in a north-trending and steeply west-dipping fault zone which is trenched out to a shallow depth along the strike for a distance of 145 feet. Two adits have been driven; one southeast 120 feet to intersect the northernmost shaft in the fault zone; the other southwest 45 feet (figs. 1/ and 2/). The latter mentioned adit has a total of 55 feet of drifts; the north drift probably intersects the southernmost shaft in the fault zone (fig. 1/). The mine is idle.

Production: Undetermined.

References: Tucker and Huguenia, 1913, p. 1.

J.R.E. 2/11/59.

Figure 1/. Sketch map showing the areal distribution (A); and a geologic sketch map (B) of the Pinto (Calidonia) mine (topography from U.S.G.S. 15' Valley Mountain quadrangle, 1956).

Figure 2/ View est toward the Pinto (Calidonia)
mine. The road leading to the mine ends at the portal
of an adit driven southwest into the hill. (see fig. 1/).

Pinto Chief Mine

Location: Sec. 1, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, 1 mile south of the Brooklyn mine and $3\frac{1}{2}$ miles southeast of New Dale (Site). See pl. 3/.

Ownership: Undetermined.

History: An old property, dating at least from the 1930's.

Geology: A northeast-trending and nearly vertical fault cuts quartz monzonite. The fault contains quartz veins of undetermined thickness and extent (Karl Schapel, oral communication, 3/8/60).

Development: A shaft is sunk 300 feet in the fault plane, and is joined to 150 feet of drifts on the 300-foot level (Karl Schapel, oral communication, 3/8/60). The mine is idle.

Production: Undetermined.

Reference: None.

J.R.E. 3/8/60

Pinto Mine

Location: Sec. 14, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 3 miles north-northeast of Mission and Sunrise Wells (pl. 3/).

Ownership: Undetermined.

History: Mr. Olsen and Mr. Jenson, Hollywood, owned and operated the mine in 1932.

Geology: Massive quartz monzonite is cut by a southwest-trending and steeply-dipping fault which contains quartz veins of undetermined length and width (Karl Schapel, oral communication, 3/8/60).

Development: The main shaft is sunk at least 200 feet in the fault. There are southwest-northeast drifts of undetermined extent on at least two levels (Karl Schapel, oral communication, 3/8/60). The mine is idle.

Production: Compiled by the U. S. Bureau of Mines.

Year	Crude Ore (tons)	Gold (oz.)	Silver (oz.)
1932	14	6	3

References: None.

J.R.E.

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Pinyon (Tingman-Holland) Mine

Location: S $\frac{1}{2}$ sec. 26, T. 3 S., R. 8 E., S.B.M., Lost Horse Mountain quadrangle, 1958; Joshua Tree National Monument, 1 $\frac{1}{2}$ miles southwest of Pinyon Well along the crest of the Little San Bernardino Mountains.

Ownership: William F. and Frances M. Keys, P.O. Box 114, Joshua Tree hold the Pinyon group of claims (White Hills, Mountain View, Pinyon, Grand View) in sec. 26.

History: The Pinyon mine was worked as early as the 1890's by A. G. Tingman and Ed Holland, Indio, who by 1891 are said to have been operating two mills in The Blue Cut, several miles north of the mine. The mine was active as late as 1907 when it was operated by W. F. Wilkinson, Indio. Subsequently the property was inactive for many years and was relocated by Mr. Keys in the 1920's. Apparently the mine has remained inactive.

Geology: The mine area is underlain by light gray to buff, deeply weathered, coarse-grained quartz monzonite (White Tank quartz monzonite). The principal workings explore a quartz vein in a shear zone. The quartz vein is 2 to 4 feet wide at the surface, strikes N. 55° W., dips steeply southwest or is vertical, and is exposed on the surface, at several points in bold outcrops, for about 2,200 feet. About 1,000 feet to the west a parallel quartz vein crops out for about 700 feet.

Development: A drift adit has been driven southeast on the principal vein and may have connected with 2 vertical shafts above on the vein. These workings are largely caved and inaccessible, but the amount of dump material suggests extensive underground workings. Crawford (1894, p. 224) reports the deepest work on the veins was 70 feet from the surface. In addition the vein has been explored by numerous short adits and prospect pits, also caved. The vein to the west has only been explored by shallow pits.

Production: U. S. Bureau of Mines records credit the "Pinon" mine, Tintman and Holland, Indio, with 483.75 ounces of gold in 1896 and in 1907 20 tons of ore yielding 7.74 ounces of gold.

References: Crawford, 1894, p. 224; Crawford, 1896, p. 313; Merrill, 1917 [1919], pp. 535-536.
C.H.G. 1/27/60.

Pinyon Well

See: New Eldorado Millsite.

Poor Boy Claim

See Cap Hunter Mine.

Postmaster Mine

See Jean Mine.

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Poulson Claim

Location: NW $\frac{1}{4}$ sec. 29, T. 6 S., R. 4 E., S.B.M.,
Hemet Reservoir quadrangle, 1940; 1 $\frac{1}{2}$ miles northeast of
Kenworthy Guard Station.

Ownership: Undetermined.

History: Undetermined.

Geology: The geology of this deposit was not determined
owing to the inaccessible state of the mine and lack of
exposure of the vein. The country rock is granitic.
The orientation of the mine buildings and site suggest
that the vein strikes northeast.

Development: The mine, now boarded over, appears to
have been entered through a shaft. Judging from the size
of the dump, the number of structures and apparently
large investment in equipment, considerable effort was
expended. If ore was mined it appears to have been
taken elsewhere for milling (figure ___/).

Production: Undetermined. Idle (1959).

References: None.

R.B.S. 10/23/59.

Priest Mine

See: Brown Mine.

Prospector Claims

Location: SE¹ sec. 13, T. 2 S., R. 24 E., S.B.M., Poston quadrangle, 7.5', 1955; on the southeast slope of the Riverside Mountains, about a quarter of a mile west of U.S. Highway 95 and 10 miles, by road, south of Vidal.

Ownership: Trust lands of the Colorado River Indian Reservation, administered by U. S. Bureau of Indian Affairs.

History: A notice found on the property indicates that in 1925 it was held by Arthur W. Williams and H. F. Wilson of Vidal. An unrepaired, bulldozed road suggests more recent activity but no record of such was found. The mine appears long unworked.

Geology: The mine workings explore mineralized zones in faulted and fractured limestone which appears to trend northeast and has an irregular but generally shallow dip. At the mine, the limestone caps two north-trending ridges about 600 feet apart, upon which it appears to be as much as 50 feet thick. The limestone is underlain by fractured granitic rocks. The more easterly ridge is cut by a vertical fault zone striking N.65°E. which contains pods and thin veins of hydrous iron oxides, specular hematite, chrysocolla, calcite, and quartz. The western ridge contains a body of contorted and sheared limestone of undetermined extent. It appears to be an essentially horizontal, tabular mass, at least 6 feet thick where exposed, which is complexly divided by shears and fractures. The shears and fractures are mineralized as are those in the eastern deposit except that secondary copper minerals appear to be more abundant.

Development: A 50-foot, vertical shaft in the eastern ridge; collar surrounded by rotten timber and caving dump material. Several shallow prospect pits lie to the northeast, and within 50-feet of the shaft. In the west ridge an adit driven 20 feet N.60°E. to the base of a 20-foot shaft which opens to the surface. At the base of the shaft is a winze, filled to within 10 feet of its collar by debris caved from the shaft above, and a 20-foot drift driven N.30°W.

Production: Undetermined.

References: None.

R.B.S. 3/16/62

Rainbow Mine

Location: NW $\frac{1}{4}$ sec. 7 (proj.), T. 8 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; on the western ridge of the Mule Mountains approximately 4 miles north-east of Wiley Well, and about 1,000 feet northeast of the Roosevelt Mine.

Ownership: O. F. Wright, P.O. Box 1062, Blythe (1958).

History: The Rainbow Mine was formerly written up with the Roosevelt Mine in a common group of 8 claims which had once been called the Santa Fe (Tucker and Sampson, 1945, p. 142-143).

Geology: The Rainbow Mine is in an area underlain by sheared granite. A vein, which pinches and swells from 0 to a maximum of 2 feet in thickness, is exposed for about 500 feet up a west-to-northwest-trending ridge. The vein strikes east-west, dips 60° N., and is thoroughly shattered. Fissures and vugs contain iron oxides, malachite, and chalcopyrite. Tucker and Sampson (1945, p. 143) state that the ore averaged ^S\$12 per ton in _Agold.

~~ENVIRONMENTAL~~

Development: A drift adit was driven on the vein from a point low on the ridge and follows the vein about 130 feet westward. The vein quartz has been stoped above the most westerly 100 feet of the adit and has been stoped to the surface at several points. Some timber is still present in the form of stulls in the stopes but no equipment or buildings remain on the site. The mine is open and dry. Access is good.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 142-143.

R.B.S. 2/19/59.

Red Cloud Group (Red Head Group)

Location: Sec. 5 (?), T. 7 S., R. 15 E., S.B.M.,
U. S. Army Corps of Engineers Chuckwalla Mountains
quadrangle, 15', 1945; on the northeast side of a north-
west-trending canyon 9 miles by dirt road southeast from
U. S. Highways 60 and 70 and 8 miles south-southwest of
Desert Center (fig. ___/).

Ownership: J. D. Huston, P.O. Box 3667 Terminal Annex,
Los Angeles 54.

History: These patented claims, the Red Head, White
Wings, Great Western, and Dottie Welborn (see herein),
(fig. ___/), were located prior to 1886. Possibly the
earliest report of the property was published in Febru-
ary 1886 but no details were given (Mining and Sci. Press,
1886, vol. 52, p. 100). The claims were worked by the
Red Cloud Mining Co., Salton, from 1899 to 1901. The Red
Cloud appears to have been idle from 1901 to 1932. In
1932 it was worked by Red Cloud Mines, Los Angeles and
from 1935 to 1940 by S. & W. Mine Development Co., 2250
Crenshaw, Los Angeles (U. S. Bureau of Mines records).

Geology: The Red Cloud Group is in an area of gneissic rocks which have a northwesterly structural trend. A quartz vein as much as 15 feet in thickness is well exposed in an outcrop about 4,500 feet long. It strikes N. 20° to 40° W. and dips 60° NE. The vein appears to lie in the plane of a fault on which continued movement has sheared both the vein and the surrounding country rock. The resulting zone of broken and mixed material reaches a maximum width of 10 feet on the Red Head Claim. The hanging wall has been altered through a zone as much as 200 feet wide. It forms a bold outcrop of buff-colored, iron stained rock in which the gneissic banding is still evident. As with the fault zone, this alteration is most extensive on the Red Head Claim (figs. __/, __/). The shearing and alteration of the country rock yields an uneven mixture of gangue material but the vein appears to consist primarily of quartz containing pockets and veinlets of iron oxides and pyrite. Fluorite is common in the dump of the Red Head but its distribution throughout the body of the deposit was not determined. Small proportions of secondary copper minerals form crusts and stains in the vein material. Scheelite has been reported present in the deposit (Elmer E. Tubbs, personal communication). The ore contains free gold but both amalgamation and cyanide were used to achieve maximum returns.

Development: The workings on the Red Cloud Group comprise three inclined shafts, one on each of the claims, from which considerable drifting and stoping was accomplished (fig. __/). The crosscut adit, shown below the White Wings Adit was intended to run northeastward some 600 feet from the Red Head Mill Site (fig. __/) to serve in part as a drainage channel but it was only about 200 feet long when operations ceased.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude ore (tons)	Recoverable Metals			
		Gold (ounces)	Silver (ounces)	Copper (lbs.)	Lead (lbs.)
1899		43.54			
1901		96.75			
1932	212	17.33	6		
1935	788	430.76	142	984	
1936	1,033	403.16	93		
1937	1	2	1		
1938	2,064	336	166	306	300
1939	185	71	17		
1940	57	19			

References: Mining and Sci. Press, 1886, vol. 52, p. 100; Orcutt, 1890, p. 900-901; Merrill and Waring, 1917, p. 539; Tucker and Sampson, 1929, p. 486-487; 1940, p. 51-52; 1945, p. 141-142.

R.B.S. 1/21/60.

Red Head Claim

See Red Cloud Group.

Red Head Group

See Red Cloud Group.

Red Streak Mine

Location: Sec. 22 (?), T. 6 S., R. 15 E., S.B.M.,
U. S. Army Corps of Engineers Chuckwalla Mountains
quadrangle, 15', 1945; 5 3/4 miles south of Desert
Center and 2 miles west of Aztec Well.

Ownership: Undetermined.

History: Undetermined.

Geology: The Red Streak Mine is high on the north
slope of a peak cut in a complex of intruded meta-
morphie rocks crossed by dikes of aplite, petmatite,
and basic igneous rock. A shear zone is exposed in
an outcrop about 130 feet long on a slope at the head
of a narrow ravine. It strikes N. to N. 10° E. and
dips 35° west-northwest. A quartz vein, 0 to 1 foot
in thickness, lies in the shear zone. The vein is
fractured and carries iron oxides as bunches of limonite
pseudomorphs after pyrite and as fracture fillings. The
gold content of this material was not determined.

Development: Near the southern extreme of the outcrop the shear zone is opened by a forked, open-cut one arm of which lies on the vein, the other on a barren zone along the footwall of a basic dike striking southwest. The arms of the cut are 10 to 15 feet long and short 10 to 12-foot adits extend beyond their faces. About 30 feet downslope to the north an adit cuts S. 10° W. through sheared granite on the footwall of another basic dike but the vein was not encountered. The remaining development comprises 4 shallow prospects downslope to the north.

Production: Undetermined. Idle, 1960.

References: None.

R.B.S. 2/24/60.

Red Top Mine

Location: Sec. 34 (proj.), T. 6 S., R. 15 E., S.B.M., U. S. Army Corps of Engineers Chuckwalla Mountains quadrangle, 15', 1945; about 5 miles south of Desert Center and 2 miles west of Aztec Well.

Ownership: J. M. De La Garza, P.O. Box 453, Desert Center (1959).

History: U. S. Bureau of Mines files show activity on a claim of this name during 1940 and 1941 under the ownership of Wiley Brothers, Blythe.

Geology: A quartz vein as much as one foot in width is poorly exposed for about 500 feet along the west side of a low granite ridge. It strikes N. 45° W. and dips 25° NE. Free-milling gold occurs in the vein. Oxides of iron, small pockets and stains of chrysocolla, and scattered bunches of galena are present.

Development: Three shafts have been driven down the dip of the vein. They are nearly equally spaced near the northwest end of the outcrop. The deepest, a 30-foot shaft, is on the east side of a shallow ravine, a 10-foot shaft lies about 65 feet to the southeast of it and a 20-foot shaft 100 feet farther southeast on the outcrop.

Production: According to U. S. Bureau of Mines records (published with permission of the owner) the Red Top yielded 64 tons of ore, during the period 1940-42, from which 33 ounces of gold and 7 ounces of silver were obtained.

References: None.

R.B.S. 4/28/59.

Renrut-Neerg (Alveston) Claim

Location: SW¹/₄ sec. 29, T. 6 S., R. 4 E., S.B.M., Hemet Reservoir quadrangle, 1940; about 2 miles east of Kenworthy Guard Station.

Ownership: E. K. Turner, Route 1, Box 32, Mountain Center.

History: Division of Mines files indicate that this property was patented in 1896 by Rueben B. Alves as 2 claims, one placer and one lode, under the name Alveston.

Geology: This property includes the sandy floor of a shallow canyon and an adjoining ridge of jointed and weathered granitic rocks to the northwest. Fine gold is disseminated in what appears to be a shallow alluvial deposit in the canyon and in a vein cutting the ridge. The vein is as much as 4 inches wide. It lies in the plane of a shear zone about 4 feet wide which strikes N. 35° E. The dip is vertical at the surface but flattens to about 75° NW. at a depth of 20 feet. This deposit is poorly exposed for about 100 feet on the crest of the ridge. The gold is contained in oxides of iron which pocket and stain the vein quartz. The owner stated that the vein averages \$17 per ton and that samples taken from thin veins in the walls of the shear zone, assayed \$5 to \$8 per ton.

Development: The owner has won small quantities of gold from the placer deposit in the canyon by means of a sluice box, however, the water supply is seasonal, and difficult to regulate or conserve.

The vein is explored by a shaft about 60 feet deep. At the bottom drifts extend 20 feet southwest and 50 feet northeast. The backs of the drifts have been overhand stoped as much as 12 feet up dip.

Production: Undetermined. ~~Idle (1959).~~

Reference: Tucker and Sampson, 1945, pl. 35.

R.B.S. 10/23/59.

Rice Claims

Location: S $\frac{1}{2}$ sec. 31, T. 7 S., R. 1 E., S.B.M., Sage quadrangle, 1954; 4 $\frac{1}{2}$ miles south of Sage. A peak named Roundtop lies on the west boundary of section 31.

Ownership: Undetermined (1958).

History: No work appears to have been done on this property for many years. According to Harry Bergman, a long-time resident in the area, this mine was operated in the early 1900's by two men named William Rice and Manny Ridge. Bergman said that these men made meager wages in gold (personal communication, Harry Bergman, Oct. 20, 1958).

Geology: The workings of this mine are spaced irregularly along a poorly exposed contact between mica schist and diorite. The contact strikes approximately N. 45° W. along the southwest side of a low ridge. It is traceable for about three quarters of a mile. The planes of schistosity are vertical and roughly parallel to the contact. Pods, stringers, and veins of quartz as much as 2 feet wide parallel the schistosity.

Development: Development comprises 5 vertical shafts and one drift adit. A sixth shaft, indicated on the Sage quadrangle, at the northwest end of the property, was not examined.

The drift adit is at the southeast end of the property. It is about 50 feet long and bears N. 45° W. on a quartz vein which ranges from 0 to 2 feet in width. Light timbering was used but it is now (July, 1958) in bad repair. The portal is partially caved. One of the vertical shafts is situated immediately in front of the adit portal. It is blocked by deranged timber and sheathing near its collar. Its depth could not be estimated. This shaft appears to explore the junction of the northwest-trending vein and a vertical shear zone bearing N. 20° E. The shear zone is filled in part by a quartz vein with a maximum width of one foot. The dump material and workings were examined briefly but no recognizable ore minerals were found.

Two shafts, about 50 feet apart, are situated approximately 1,000 feet northwest of the adit. These shafts are on a shear trending N. 40° E. The northeast shaft is vertical to a depth of about 40 feet below which point it slopes steeply to the northeast to an undetermined depth. No vein is exposed near the collar. Though some timber remains in this shaft, entry is hazardous. The southwest shaft is vertical for an estimated depth of about 100 feet below which point it is flooded. The depth was not determined. It is untimbered. A quartz vein as much as four inches wide follows the plane of the shear where it is exposed at the collar.

The remaining 2 shafts are about 300 feet farther northwest and are about 200 feet apart along a line drawn northeast between them. The northeastern-most shaft is about 75 vertical feet higher than the southwest shaft. It is about 100 feet deep to water. the collar is in barren schist, however, the dump material indicates the presence of vein quartz at depth. Though some timber remains at the collar, entry was not possible. The southwest shaft is also about 100 feet deep to water. There is no vein exposed at the collar. The dump consists largely of dioritic material with minor amounts of vein quartz. One small crystal of molybdenite was found in a fragment of quartz. The shaft is untimbered and the collar is surrounded by a light wire fence (July, 1958).

Production: Undetermined.

References: None.

R.B.S. 7/25/58.

Rich Gold (Gold Crown #2) Mine

Location: Sec. 8 (?), T. 3 S., R. 10 E., S.E.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, about 4 miles southeast of White Tank, and about $\frac{1}{4}$ mile south of the West Pinto Basin Road (see pl. 2/).

Ownership: Undetermined.

History: Originally located as the Gold Crown #2. Relocated as the Rich Gold mine July 1, 1931 by S. B. Trujillo and Loyd E. Kinder, 1223 W. 5th St., San Bernerdino.

Geology: Pinto Gneiss is cut by west-trending minor faults and a northwest-trending pegmatite dike (fig. 1/). The faults contain thin specularite-hematite-chalcopyrite (?) bearing quartz veins.

Development: Two shafts, one 25 feet and the other possibly 100 feet deep are sunk in the plane of a west-northwest-trending fault (fig. 1/), locs. 3 and 4). At locality 2 a 15-foot shaft is sunk 15 feet in a west-trending fault. The pegmatite dike is exposed in a shallow 20-foot long northwest-trending open cut (fig. 1/, loc. 1). The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 1/25/60.

Figure 1/. Sketch map showing the areal distribution of the workings (A), and a schematic geologic sketch map (B) of the Rich Gold (Gold Crown #2) mine (topography from U.S.A.C.E. 15' Pinkham Well quadrangle, 1943).

Romoland Group

Location: SW $\frac{1}{4}$ sec. 23, NW $\frac{1}{4}$ sec. 26, T. 5 S., R. 3 W., S. B.M., Romoland quadrangle, 7.5', 1953; 2 miles south of Romoland.

Ownership: Undetermined.

History: Undetermined.

Geology: The Romoland Group is on a short, north-trending ridge of dioritic rocks on the north side of an unnamed group of hills. Narrow, poorly exposed quartz veins lie ⁱⁿ on shear planes which strike N. 25° E. to N. 25° W. and dip 50° SE. to 70° NE. as exposed in the workings. The quartz is unevenly mineralized with of iron oxides clots and fissure fillings/a sample of which, when panned, showed traces of gold. Where observed, the veins range from a fraction of an inch to 2 inches in thickness.

^{A shear}
Development: ~~The fault~~ was explored on the north slope of the ridge by a partly caved, 15-foot shaft inclined S. 20° E. at about 45°. On the east slope a second shaft was sunk about 50 feet on the 70° dip of a vein. In a shallow ravine on the west side of the ridge an adit was driven S. 85° E. in apparently-barren diorite. The portal is partially caved but the adit appears to be at least 100 feet long.

Production: Undetermined.

References: None.

R.B.S 6/18/59

Ronnie B. Mine

See Atlanta Mine.

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Roosevelt (Roosevelt and Rainbow, Sante Fe) Mine

Location: NW $\frac{1}{4}$ sec. 7 (proj.), T. 8 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; on the western ridge of the Mule Mountains about 4 miles northeast of Wiley Well.

Ownership: Undetermined (1958).

History: In 1945 Tucker and Sampson (p. 142-143) reported that the Roosevelt Mine was part of a group of 8 claims which included the nearby Rainbow Mine. The Roosevelt and Rainbow were formerly known as the Santa Fe.

Geology: The country rock is highly sheared granite. A fault trace is poorly exposed along the floor of a narrow canyon where it strikes N. 50° - 60° E. and dips about 50° SE. The fault zone contains irregular bodies of sheared vein quartz material which, according to Tucker and Sampson (1945, p. 143), forms a talcose gouge, mineralized with free gold, which assays from \$8 to \$100 per ton.

Development: The mine comprises 2 inclined shafts about 100 feet apart. The western shaft slopes about 60° near the collar, flattening to approximately 45° at a depth of about 50 feet. The eastern shaft appears to slope similarly. The depth of these shafts was not determined. According to Tucker and Sampson, in 1945 the western shaft was about 135 feet deep. At 60 feet below the collar of the shaft a 50-foot drift extended westward and a 20-foot drift eastward. No reference is made to any drifting from the eastern shaft.

When visited (1958) the timbering in the collars of the shafts was in fair condition. An ore bin, in good repair, still stood near the west shaft. The road to the mine was passable.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 142-143.

R.B.S. 2/19/58.

Rosario Mine

See Santa Rosa.

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Rose of Peru

Location: Sec. 1, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about 3 miles southeast of New Dale (Site) and about 1 mile south of the Brooklyn mine (pl. 3/).

Ownership: Bonnie H. Cehl, 777 East 9th Ave., San Bernardino owns 2 unpatented lode claims (March 1960).

History: Originally owned and operated by Karl Schapel, Box 113, Twentynine Palms, from 1939 to 1941.

Geology: Generally north-trending and steeply-dipping quartz veins of undetermined extent occur in massive quartz monzonite.

Development: The main shaft, adjacent to the road, is 300 feet deep and sunk 70° E. on a vein. There are 600 feet of north-south drifts on the 200-foot level (Karl Schapel, oral communication, 3/8/60). About a quarter of a mile northeast of the main shaft another shaft is sunk 100 feet on a north-trending and steeply-dipping vein. This shaft is joined to 125 feet of drifts on the 100-foot level (Karl Schapel, oral communication, 3/8/60). Other workings are of minor extent and consist of shallow shafts, short adits and prospects. The mine is worked intermittently by the owner.

Production: Compiled by the U. S. Bureau of Mines
and published with permission of the owner.

Year	Crude Ore (tons)	Gold (oz.)	Silver
1939	33	33	
1940	10	6	
1941	12	17	

References: None.

J.R.E. 3/8/60.

Ruby Lee Claim and Millsite

Location: The mill site is in sec. 10, T. 4 S., R. 11 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, bordering the Pinto Basin, about 4 miles northwest of the West Pinto Basin - Cottonwood Pass - East Pinto Basin road intersection. The claim was not found but there are several small prospect pits in section 9 about 1 mile west of the millsite. A Jeep road leads west from the millsite to the prospects.

Ownership: A. A. Dietemann, 874 North Beverly Glen, Los Angeles 24, owns 1 unpatented claim and 1 millsite (March 1958).

Geology: The mill site and prospects are underlain by massive but strongly jointed hornblende granite.

Development: At the millsite a cabin and a few sheds house miscellaneous equipment (elevation 3,000 feet). A jeep road leads east from the millsite to a junction with the West Pinto Basin Road about 3 miles northwest of its junction with the east Pinto Basin Road and Black Eagle mine road.

Production: Undetermined.

References: None.

J.R.E. 10/14/'59

Rusty Gold (Summit or Sunset Group) Mine

Location: Sec. 15, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about 1 mile southwest of the Gold Crown mine and close to $3\frac{1}{2}$ miles south of New Dale (Site). See pl. 3/.

Ownership: Undetermined.

History: Originally located as the Sunset group of 7 claims in the 1920's by Jack Meek, Twentynine Palms. By 1929 only exploration work had been done and the property was idle (Tucker and Sampson, 1929, p. 488). From 1929 to 1944 several shafts ranging in depth from 10 to 20 feet had been sunk, and in 1945 the property was again reported idle. Jack Meek, however, was still the owner (Tucker and Sampson, 1945, p. 144) but had apparently relocated the claims as the Summit group. A. T. Roy, Twentynine Palms, worked the claims in 1956 and recorded a small production of copper. The mine was not being worked on the day of the property visit.

Geology: A series of west-trending vertical quartz veins as much as 2' feet thick occur along minor faults in quartz monzonite.

Development: The main shaft is sunk vertically 35 feet in a fault containing a hematite-gold quartz vein 1-foot in average thickness. There appears to be short drifts in the fault plane at the 15-foot level. There are several other shallow prospects from 10 to 20 feet in depth sunk on quartz "blow-outs" and veins; all in close proximity to the main shaft.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude Ore (tons)	Gold (oz.)	Copper (lbs.)
1940	5	5	
1956	15	(237) →	

References: Tucker and Sampson, 1929, p. 488; Tucker and Sampson, 1945, p. 144.

J.R.E. 3/30/60

San Antonio Mine

Location: SE¹/₄ sec. 32, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7.5', 1953; about four miles west of Perris (see fig. ___/).

Ownership: Roger Clapp, c/o Lawrence Butterfield, 822 N. June Street, Hollywood.

History: U. S. Bureau of Mines files show that this claim was worked by Ralph Mellor, Perris, in 1935 and by Dick Montijo from 1938 through 1940. No previous record was found.

Geology: The San Antonio claim lies high on the northwest slope of a ridge composed of deeply weathered dioritic rock. The claim includes the outcrop of a poorly exposed quartz vein as much as one foot wide which strikes N. 70° E. and dips about 25° SE. The lateral extent of the vein appears to be about 1000 feet. The vein quartz contains veinlets and bunches of iron oxides which carry free-milling gold.

Development: The vein has been explored through six inclined shafts five adits and an open cut (fig. ___/). The most extensive of these workings, inclined shaft #6, is shown in greater detail in figure ___/.

In addition to gold ore, residual boulders of the dark, blue-gray country rock have been quarried on this claim. These dense, homogenous masses yield an attractive product called "black granite" (see section on granite).

Production: Compiled by the U.S. Bureau of Mines and published with permission of the owners.

Year	Crude ore tons	Recoverable Metals Gold(ounces)
1935	14	2.97
1938	2	1.00
1939	4	1.00
1940	3	1.00

References: None.

R.B.S. 6/17/59

San Diego Mine

See Gold Crown Mine.

Santa Fe

See Roosevelt and Rainbow Mines.

Santa Fe Group

Location: NW $\frac{1}{4}$ sec. 31, T. 4 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7 $\frac{1}{2}$ ', 1953; about 6 miles west
of Perris.

Ownership: Undetermined (1959). Three patented ^{lode}
claims, the (Adyar, Florence, ^{and} Goldbug) and ^{the patented} Adyar Mill site.

History: The Santa Fe Group was first worked prior
to 1881 (Goodyear, 1888, p. 527), but was idle in that
year. Activity was renewed briefly in 1893 under the
ownership of Phelps, Judson and others, Pasadena
(Storms, 1894, p. 224). F. M. Woods and others, having
brought in a 5-stamp mill from the Temescal tin mine,
worked the Santa Fe from 1894 to 1896 (Mining and
Scientific Press, 1894, vol. 69, p. 394; Crawford,
1896, p. 314). There is no subsequent report of acti-
vity on these claims.

Geology: The Santa Fe Mine is on the north slope of
a low ridge composed of deeply weathered diorite. The
poorly exposed vein strikes N. 70° W. and dips about
45° SW. The width of the vein could not be determined
but is probably less than a foot. The vein material found
on the surface consists of two types of material; quartz-
tourmaline and quartz containing pockets and fractures
filled with oxides of iron. The ore, presumably the
latter of the above, was once reported to be on a par
with that found elsewhere in the district (Mining and
Scientific Press, 1895, vol. 70, p. 106); about \$30 per ton.

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Development: The indistinct outcrop of the vein was explored by an inclined shaft and closely spaced pits and shallow shafts along a strike distance of about 300 feet. An adit was driven into the ridge about 100 vertical feet below the outcrop. It was reported to have extended 700 feet southwest and to have cut the vein 500 feet from the portal (Crawford, 1896, p. 314). The adit and the inclined shaft were boarded up when the property was visited and the upper workings were in bad repair.

Production: Undetermined, (1959).

References: Crawford, 1894, p. 224; Mining and Scientific Press, 1894, vol. 69, p. 394; 1895, vol. 70, p. 106, 382; Crawford, 1896, p. 314; Merrill and Waring, 1917, p. 530; Tucker and Sampson, 1929, p. 487; Sampson, 1935, p. 514.

R.B.S. 9/23/59.

Santa Rosa (Rosario, Northern Belle) Mine

Location: SE $\frac{1}{4}$ sec. 30 and NE $\frac{1}{4}$ sec. 31, T.4 S.,
R. 4 W., S.B.M., Steele Peak quadrangle, 7.5', 1953;
about 6 miles west of Perris.

Ownership: Undetermined (1959).

History: The Santa Rosa was located about 1879 by
Mexicans who worked the ore in arrastras (Mining and
Scientific Press, 1894, vol. 69, p. 394). W. A. Good-
year (1888, p. 527) referred to the property as the
Rosario or Northern Belle and gave its location and a
brief description of the vein and the rocks in the area.
In 1893 (Storms, p. 384) the name Santa Rosa had been
adopted and the mine was reported active. By 1893 a
mill building had been erected on the property. This
was probably the structure shown in photos in subsequent
reports (Crawford, 1896, following p. 310; Merrill and
Waring, 1917, p. 530) in which a 20-stamp mill was in-
stalled (Crawford, 1894, p. 224-225; Sampson, 1935, p. 514).

At present (1959) the Santa Rosa is idle. All
structures and machinery have been removed.

Geology: The vein explored by the Santa Rosa Mine,
though reported to be as much as 3 feet wide (Sampson, 1935,
p. 514), is poorly exposed on the surface. It strikes
N. 10° W. and dips 45° SW. (Crawford, 1896, p. 314). These
observations were not confirmed owing to the inaccessible
state of the mine. The country rock is diorite.

Development: The vein was explored to a depth of 200 feet by inclined shafts and trenched along its strike for about 1,000 feet (Crawford, 1894, p. 224-225; Sampson, 1935, p. 514). The workings are now caved.

Production: During the years 1895-1901, the Santa Rosa mine yielded 6,745.40 ounces of gold in an unreported tonnage of ore (U.S. Bureau of Mines records).

References: Goodyear, 1888, p. 527; Storms, 1893, p. 376; Crawford, 1894, p. 224-225; Crawford, 1896, p. 314; Merrill and Waring, 1917, p. 592; Tucker and Sampson, 1929, p. 487; 1945, pl. 35; Sampson, 1935, p. 514.

R.B.S. 6/15/59.

Schellenger Mine

Location: Sec. 18 (proj.), T. 4 S., R. 22 E., S.B.M., Big Maria Mountains quadrangle, 1951; on the west slope of a hill, about 1½ miles north of Black Hill. *on the west of Black Hill*

Ownership: Undetermined (1958).

History: In 1929 Tucker and Sampson, (p. 487) reported that a total of 6 claims were held by E. E. Schellenger, Blythe, but only assessment work had been done. By 1945 (Tucker and Sampson, p. 143) development had progressed to essentially the present state, and the mine was idle. Ownership had changed to T. A. Ashby, Rice, and M. A. Anderson, Pasadena. When visited in December, 1958, the Schellenger mine appeared long idle.

Geology: The country rock is gneiss cut by granitic pegmatite dikes as much as 6 feet wide which strike northwest. The dip of one, taken where it crosses the mine area, is 40° NE. A fault which trends east and dips 35° N. offsets the pegmatite dikes. The fault fissure is filled by a quartz vein as much as 18 inches wide. Layers of chlorite 1-2 inches thick lie along both the foot and hanging walls. The vein is fractured and the chlorite is slickensided, suggesting post-mineralization movement. The ore minerals are pyrite and oxides of iron, reported to carry \$15 per ton in gold (Tucker and Sampson, 1945, p. 143).

Development: Two adits, a lower and an upper, are driven east on the vein. The lower adit is about 70 feet long, open, dry, and untimbered except at the portal. A narrow raise extends a few feet up the vein from the face of the lower adit but is not holed-through to the upper workings. The upper adit is roughly 30 feet higher on the vein and about 50 feet farther east. It is 30 feet long and untimbered.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 487; 1945, p. 143.

R.B.S. 12/19/58.

Shannon Mine

Location: NW $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M.
(proj.), Valley Mountain quadrangle, 1956; Pinto
Mountains, Gold Park area, 8.1 miles S. 23° E. from
Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Undetermined.

Geology: Hornblende granite is cut by thin aplite
and pegmatite dikes, and contains gold (?) bearing milky
quartz veins as much as 1 $\frac{1}{2}$ feet thick. Minor, nearly
vertical faults occur locally. A fissure filling of
vein quartz is exposed in the adit nearest the road
(fig. 1/).

Development: The workings consist of 2 adits, one
driven northeast 38 feet, the other southwest 25 feet,
a 100-foot shallow trench, a prospect pit, and a shaft
inclined 60° E. and sunk to a depth of about 30 feet
(fig. 1/). The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 2/12/59.

Figure 1/. Geologic sketch map of the Shannon
mine.

Silver Bell Mine

Location: Sec. 8 (?), T. 3 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Mexie Mountains, Joshua Tree National Monument, about 4 miles southeast of White Tank, and about $\frac{1}{2}$ mile southwest of the West Pinto Basin Road (see pl. 2/).

Ownership: Undetermined. (December 1959).

History: Originally owned by W. F. Keys, P.O. Box 114, Joshua Tree. Prospected for gold during the 1930's, then idle for many years. Latest exploration was for copper in the mid 1950's. In 1956 the property was sold to Farrington Mann, 9207 S. Lakewood Blvd., Rivera.

Geology: Pinto Gneiss is cut by two major faults, several minor faults, and is intruded locally by thin, highly altered, basic dikes (see fig. 1/). A zone of crushed material containing highly oxidized chalcopyrite-pyrite-specularite-gold bearing quartz is well exposed in the open cut along a north-trending and steeply east-dipping fault (see fig. 1/). The wall rock is highly stained and altered, and contains secondary copper (chrysocolla-azurite-malachite) and iron (limonite-hematite) minerals (fig. 1/).

Nearly 500 feet southeast of the open cut a west-trending and steeply south-dipping fault zone, as much as 20 feet wide and at least 200 feet long, separates Gold Park gabbro-diorite from Pinto gneiss. No mineralization was observed in this gouge zone. The minor faults contain thin quartz stringers and veins (see fig. 1/).

Development: Older work along the northwest slope of a northeast-trending ridge consists of 2 shallow shafts sunk on gold (?) quartz veins contained in minor faults (fig. 1/, (1) and (2)). Mining of the copper-bearing crush and altered zone has involved the shaving off of the east slope of a small knob-like hill (fig. 1/, (3)). About 500 feet southeast of the cut 2 narrow and relatively old burrows have been driven into a west trending gouge zone; one about 280 feet, the other only 25 feet (fig. 1/, (5)). About 400 feet west of the burrows an adit is driven close to 160 feet in much fractured Pinto gneiss containing altered dikes (fig. 1/, (4)).

Production: Several tons of material were processed for copper in the mid 1950's at a mill in sec. 16, T. 1 N., R. 9 E., S.B.M., San Bernardino Co., about 2½ miles north of Twentynine Palms on Utah Trail. Concentrates produced were not marketed.

References: None.

J.R.E. 12/11/59.

Hand-drawn sketch map

Figure 1/. Sketch map showing the areal distribution, and geologic sketch maps of the workings at the Golden Bell (Blue Bell) and Silver Bell Mines.

Silver Scorpion Mine

Location: SE $\frac{1}{4}$ sec. 1, T. 2 S., R. 9 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, 8.7 miles S. 28° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: Carlos J. Bassler, Jr. and Francis E. Bassler located the property October 16, 1953 (see Ownership, Carlos Jr. gold mine).

Geology: Epidote-rich Gold Park gabbro-diorite has been injected by hornblende granite which is cut by a northwest-trending fault. Thin stringers of aplite, and tabular gold (?) bearing milky quartz veins occur in the immediate area, but are strongest in the fault zone.

Development: A shaft is sunk 20 feet on a 56° SW. inclination in the plane of a northwest-trending fault. The shaft is near the center of a trench that has exposed the fault nearly continuously along a 50-foot line (fig. 1/). At 20 feet a drift extends southeast for an unknown distance paralleling the fault line exposed on the surface (fig. 1/). It is idle.

Production: Undetermined.

References: None.

J.R.E. 3/20/59.

Figure 1/. Geologic sketch map of the Silver
Scorpion mine.

Sinock Mine

Location: Sec. 17 (?), T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, about $3\frac{1}{4}$ miles northwest of Mission and Sunrise Wells (see pl. 3/).

Ownership: Undetermined.

History: Probably a mine active in the 1930's. It does not appear to have been worked in recent years.

Geology: The mine is in massive quartz monzonite cut by steeply-dipping faults of random orientation. One shaft is sunk on a north-trending and 70° E.-dipping fault; the other is sunk on a N. 70° E.-trending and 80° W.-dipping fault. Both faults undoubtedly contain quartz veins, but as the workings were not entered, and the dump covered most of the surface outcrops, no statement can be made concerning their thickness and extent.

Development: The main shaft, sunk in the north-trending fault, is at least 80 feet deep and probably is joined to drifts at several levels driven in the plane of the fault. Total workings here are estimated to be 400-500 feet. Several tens of yards southwest of the main shaft is another shaft. It is sunk at least 100 feet in the plane of the N. 70° E.-trending fault. Work done here is less than at the main shaft, perhaps 200-300 feet total. The mine access road is narrow and poor.

Production: Undetermined.

References: None.

J.R.E. 3/30/60

Sippi Mine

See: Lost Angel mine.

Smith Brothers Claims

Location: Smith Brothers No. 1 is in the SW $\frac{1}{4}$ sec. 8, Smith Brothers No. 4 is in the NE $\frac{1}{4}$ sec. 7 of T. 2 S., R. 10 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, about 10 miles S. 30° E. of Four Corners, Twentynine Palms (see pl. 1/). Smith Brothers No. 8 is in the NE $\frac{1}{4}$ sec. 19, T. 2 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15, 1943; Pinto Mountains, 11.2 miles S. 25° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Undetermined.

History: John Uland, Milton B. and Albert H. Smith located the claims in 1955.

Geology: The country rock at prospect No. 1 is Pinto gneiss and at prospect No. 4, Palms granite. Country rock is cut by minor faults, and intruded by fine-grained green basic dikes as much as 2 feet thick. Secondary copper mineralization is in evidence at one prospect (fig. 1/). At No. 8 claim hornblende granite is cut by steeply south-dipping fault carrying hematite-chalcopyrite-gold (?) bearing milky quartz veins.

Development: A shallow prospect characterizes No. 1 claim, while 4 prospects and a shaft sunk 35 feet vertically comprise the workings at No. 4 claim (fig. 1/). At No. 8 claim a shaft has been sunk vertically 14 feet on a N. 75° E.-trending fault. Short drifts extend ~~out~~ from the ^{foot} bottom of the shaft in nearly east and west directions (fig. 1/). The claims were not being worked on the day of the property visit.

Production: Undetermined.

References: None.

J.R.E. 3/17/59.

Figure 1/. Sketch maps of the Smith Brothers
claims (pl. 1/).

Snowcloud Mine

Location: Sec. 1, T. 5 S., R. 9 E., or sec. 6, T. 5 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Cottonwood Mountains, about 6 miles northwest of Cactus City in Pinkham Canyon.

Ownership: Clifford S. Coy, 2032 Genevieve Street, San Bernardino, owns 3 unpatented lode claims (January 1960).

History: In 1935 the mine was active and J. P. Coy, W. L. Secomb, and C. S. Coy, Highland, were the owners.

Geology: Pinto gneiss underlies the southwest slope of a northwest-trending ridge. The gneiss is cut by a north-trending and 30° E-dipping fault. A well developed gouge zone 1 to 3 feet thick contains an oxidized milky quartz vein.

Development: A tunnel is driven 90 feet south in the fault plane, through a small projecting ridge, to intersect a shaft. The shaft is sunk 40 feet 80° east in the fault plane; from which point it shallows and extends on possibly another 100 feet. The vein has been much overhand stoped at several places to the surface, from the floor of the tunnel along its course to the shaft intersection. The mine is accessible by jeep trails leading north through Pinkham Canyon from Cactus City. It is at an elevation of 3000 feet and is idle.

Production: Compiled by the U. S. Bureau of Mines
and published with permission of the owner.

Year	Crude ore (tons)	Recoverable metals	
		Gold (ounces)	Silver (ounces)
1935	35	47	8

References: None.

J.R.E. 1/23/60.

Standard Mine

Location: Sec. 13, T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, Joshua Tree National Monument, about 3 miles north-northeast of Mission and Sunrise Wells (pl. 3/).

Ownership: Undetermined.

History: ^{See Karl Schapel.} The mine was owned and operated by Willard Allen and Joe Geiger, Twentynine Palms, from 1938 to 1941.

Geology: Massive quartz monzonite is cut by a southwest trending fault which contains gold-quartz veins of undetermined length and width (Karl Schapel, oral communication, 3/8/60).

Development: A drift adit comprises the main workings and is driven at least 300 feet southwest in the plane of the fault. Other work is of relatively minor extent and consists mainly of shallow shafts and prospects, although one shaft is at least 50 feet deep (Karl Schapel, oral communication, 3/8/60). The mine is idle.

Production: During the years 1938 to 1941 the Standard mine yielded about 700 tons of ore from which 631 ounces of gold and 46 ounces of silver were recovered.

References: Tucker 1933, unpublished Field Report No. 122

J.R.E.

Stanford Mine

Location: NE $\frac{1}{4}$ sec. 9, T. 5 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7 $\frac{1}{2}$ ', 1953; on the west
slope of a narrow north-trending ridge 1 mile south-
east of Steele Valley.

Ownership: Undetermined.

History: By 1894 the Stanford Mine had been developed
to essentially its full extent and a small, 5-stamp mill
installed under the ownership of Hearn ^{Brothers} Bros. of Perris
(Crawford, 1894, p. 225). In 1896 the mine was idle
(Crawford, 1896, p. 314) and no report of subsequent
activity was found.

Geology: The Stanford Mine penetrates a dip slope
underlain by fractured, phyllitic rocks which strike
north and dip 35° W. These rocks are cut by a poorly
exposed fault which strikes N. 25° W. and dips 45° -
75° SW. The sheared zone comprises an irregular body
of sheared rock as much as 3 feet wide containing
crushed, iron-stained quartz veins as much as 1 foot
in thickness and what appears to be a thin porphyry
dike.

Development: The fault is explored by an inclined shaft, reported by Crawford (1894, p. 225) to be 125 feet deep, a 50-foot crosscut and a drift of undetermined length. The crosscut cuts the fault 35 feet from the portal and 15 feet north of the shaft. The drift extends south from the crosscut to and beyond the shaft a distance of at least 50 feet, it being impossible to cross the shaft to determine its southern extent. The drift crosses the shaft about 40 feet below the collar. When visited (October, 1960) the mine was untimbered, open, and dry.

Production: Undetermined.

References: Crawford, 1894, p. 225; 1896, p. 314; Merrill and Waring, 1917, p. 532; Tucker and Sampson, 1929, p. 487.

R.B.S. 10/21/60.

Stanford Mine, Small Prospects Near

Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 5, T. 5 S., R. 4 W., S.B.M.,
Steele Peak quadrangle, 7 $\frac{1}{2}$!, 1953; at the southwest edge
of Steele Valley about 5 $\frac{1}{2}$ miles southwest of Perris.
Some prospects probably are in the SW $\frac{1}{4}$ of the section.

Ownership: Undetermined.

History: This area was being prospected and mined
in a small way in 1893 and 1894 (Crawford, 1894, p. 225)
but the lack of any other reference makes the duration
of these operations uncertain.

Geology: The country rock, granodiorite, has been
eroded to an irregular pattern of low knolls and
swales. A shear zone as much as 10 feet wide is
exposed for about 300 feet. It strikes N. 15° W. and
dips 85° NE. Quartz, ~~both massive and finely crystalline,~~
forms stringers and veins ranging from 0 to 4 inches wide
in the sheared country rock. The quartz is pocketed and
stained with iron oxides and was reported (Crawford, 1894,
p. 225) to be rich in gold in some spots.

Development: The main development is a caved shaft of unknown original depth but now about 30 feet deep. A short crosscut appears to have been driven east at the 15-foot level but ^this, too, is now caved. The shaft is at the southeast end of the outcrop. To the northwest the trend of the shear zone is pock marked by numerous shallow prospect pits, now largely filled and grown over by brush. Just south of the shaft, and near the dirt road which traverses Steele Valley, an old arrastra ²pit is still discernable. ⁱ

Production: Undetermined.

References: Crawford; 1894, p. 225.

R.B.S. 9/25/59.

Star Mine

See Frank Hill mine.

Steece (Black Canyon) Group

Location: Sec. 1, T. 2 S., R. 23 E., and sec. 6, T. 2 S., R. 24 E., S.B.M., Parker quadrangle, 1950; on the eastern slope of the Riverside Mountains 6 miles south of Vidal.

Ownership: Desert View Mines Inc., c/o Grace M. Tucker, Shattock Hotel, Berkeley 4. This owner holds the unpatented Silver Dome, Fraction, Gossen, Jackknife, Ernie, and Melvill lode claims and the adjacent, patented Black Canyon, Barnes, Buena Vista, Triangle, Emerald Copper, Green Gobbler Copper, Ruby Copper, Soda Basin Copper, and Washington lode claims (1957).

History: The Steece Group was first reported-on in 1917 (Merrill and Waring, p. 543) at which time it was owned by Richard Silliland and Ed Arnold of Calzona. At that time the main shaft was 500 feet deep. In a 1929 report the mine was said to be idle but soon to be reopened under the ownership of C. W. Mitchell, Parker House, Boston, Massachusetts (Tucker and Sampson, 1929, p. 487-488). Subsequently, according to the old ^{described} U. S. Bureau of ^{Glendale} Land Office records (1938), these claims had passed into the ownership of the Vidal Mining Co. and were reported as the "Black Canyon Group."

-17.5-

Geology: The Steece mine is in a geologically complex area. A folded and contorted section of limestone and cherty dolomite about 700 feet thick is separated from underlying schists along a shear zone which strikes roughly east-west, dips 10° N., and is exposed along the base of the mountains for about half a mile. The shear zone is mineralized with gold-bearing veins as much as 20 feet in thickness composed of quartz, hematite, barite, malachite, and chrysocolla.

Development: The extent of underground development was not determined but it appears to have explored downward along the shear zone. The mine is entered through several inclined shafts and adits. Ore appears to have been trammed down the several hundred feet of steep slope to stock-piling and loading points in a canyon which cuts west through the foothills and up which a road leads to the mine.

The final depth of the mine is reported to be 900 feet (Jack Stewart, Parker, Arizona, personal communication Feb. 18, 1958).

Production: Undetermined.

References: Merrill and Waring, 1917, p. 543; Tucker and Sampson, 1929, p. 487-488; 1945, pl. 35.

R.B.S. and C.H.G. 12/19/57.

Steele Mine

See Top of the World Mine.

Stella Mine

Location: Sec. 10, T. 2 S., R. 12 E., S.B.M. (proj.), Dale Lake quadrangle, 1956; Pinto Mountains, about 3 miles south of New Dale (Site) and approximately 1/10 mile north of the Gold Crown mine (see pl. 3/).

Ownership: Ivan C. Winter, Box 1271, Twentynine Palms, owns 4 unpatented lode claims and a millsite.

History: The property was discovered in the late 1950's and has been worked intermittently since that time. A gold quartz mill was in a nearly complete stage of assembly on the day of the property visit.

Geology: Thin and discontinuous quartz veins intrude massive quartz monzonite and are strongest along pre-existing minor faults. The largest vein observed was about 6 inches in average thickness.

Development: Four shallow vertical shafts are sunk in minor faults. The deepest shaft is 15 feet.

Production: None as of March 1960.

References: None.

J.R.E. 3/10/60

Sterling Mine

Location: Sec. 30 (?), T. 6 S., R. 14 E., S.B.M., U. S. Army Corps of Engineers Canyon Spring quadrangle, 15', 1944; on the northeast slope of the Orocopia Mountains, $3\frac{1}{2}$ miles south of U. S. Highways 60 and 70 and $1\frac{1}{2}$ miles southeast of the Gold Cup Group in a southwest-trending canyon.

Ownership: Undetermined.

History: This group of claims was located prior to 1896. During that year the property was being worked and a 10-stamp mill under construction by the Sterling Mining Co., Los Angeles (Crawford, 1896, p. 314). The Sterling was once reported to have been a part of the Red Cloud Group (Merrill and Waring, 1917, p. 539) but its distance from that group makes this seem unlikely. The same report states that the mill had been moved to the Lost Horse Mine in the Pinon District so, presumably, the mine was idle. The appearance of the mine and camp sites suggests subsequent operation but no record of this was found.

Geology: The Sterling mine workings explore two faults which lie athwart a quartz monzonite-gneiss contact (fig. ___/). One fault strikes east across a low ridge. On the ridge crest it dips vertically but flattens to about 80° N. where exposed in the workings. The other fault converges from the southwest. It strikes N. 80° E. across a ravine just west of the ridge and dips vertical to steeply southeast (fig. ___/).

Discontinuous quartz veins, ranging from 0 to 5 inches in thickness, lie in the planes of the faults. In addition, the fault in the ravine has been intruded by a basic dike. Locally the veins contain heavy concentrations of porous iron oxides in an irregular central zone. Voids in the oxides commonly contain yellow, tabular crystals of wulfenite as much as half an inch across. No information was obtained on the gold and molybdenum content of the veins.

Development: The vein in the ridge is explored by an adit, a 10-foot shaft, and several shallow prospects. The adit was driven S. 70° E., 50 feet on a barren shear zone. A crosscut was then run 33 feet N. 35° E. to the vein on which a drift was driven 40 feet east. The shaft was sunk where the vein crosses the ridge, about 100 feet up the slope from the adit portal.

The vein in the ravine has been prospected by
at least 12 shallow pits but no deeper work was done.

Production: Undetermined. ~~Idle (1960)~~

References: Crawford, 1896, p. 314; Merrill and
Waring, 1917, p. 539.

R.B.S. 2/11/60.

Stone House (La Rica) Mine

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 4 (proj.), T. 8 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1954; on the crest of the Mule Mountains half a mile northeast of the Hodges mine and about 3 miles west of Ripley. The mine is reached by means of a steep, narrow trail up the ridge due north of the stone house on the old Hodges campsite.

Ownership: Joe Hannah Jr., et al., c/o Melvin Wehe, 121 W. Charter Way, Stockton (1955) were the last known owners.

History: The Stone House mine is one of an undetermined number of old lode claims. Papers in the area indicate at least eleven claims were held in 1955 under this name, by the above noted owners. Judging from an old description, it is possible that this is the old La Rica mine (Tucker and Sampson, 1929, p. 483).

Geology: This mine apparently was opened in ~~the~~ search for gold in a fault zone that cuts gneissic granite. The fault zone is about 10 feet in average width and can be traced for about 200 feet up the slope at the head of a steep canyon. It strikes N. 45° W., and dips 45° SW. The mineralization appears to be confined to the quartz veins which are as much as one foot thick and thoroughly fractured. Hematite is common in fissures and vugs along with small amounts of chrysocolla, present as stains and coatings. Calcite and chlorite occur as scattered masses about an inch in average size.

Development: Two short adits and 2 shallow prospect pits explore the fault. The adits are driven northwest just below a saddle at the head of the canyon and the ^{are} 2 prospects/a few tens of feet above them near the saddle. The lower adit is about 40 feet ^{long} ~~deep~~. The upper adit, 50 feet higher on the same vein, is 15 feet ^{long} ~~deep~~. Both adits are untimbered, and were open and dry in February, 1958.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 483.

R.B.S. 2/21/59.

Sunrise Mine

Location: Sec. 26, T. 2 S., R. 12 E., S.B.M. (proj.),
U. S. Army Corps of Engineers Eagle Tank quadrangle, 15',
1943; southeastern tip of the Pinto Mountains, one mile
north of Mission Well.

Ownership: Howard M. Fox, 810 N. Whittier Drive,
Beverly Hills.

Geology: Quartz veins in sheared quartz monzonite. Just south of the shaft a well defined fault strikes north to N. 20° W., is steeply dipping, and is exposed for a strike length of several hundred feet. At the shaft no vein material was observed, but in 1940 Tucker and Sampson (p. 52, 53) reported "A series of parallel quartz veins in granite; strike N. 20° W., dip 70° SW.; width 2 to 4 feet."

Development: By 1933 the Sunrise Shaft had been sunk to a depth of 300 feet on an inclination of 79°, with levels at 100, 200, and 300 feet. In 1940, (p. 52-53) and again in 1945 (p. 143-144) Tucker and Sampson reported these workings with no additions. The shaft is boarded over (1961) and timbered so the vein is not visible; but the inclination is due west. All surface equipment has been removed.

History: The Sunrise Mine is said to have been discovered about 1900 and apparently was intermittently active until the mid 1930's. In 1929 it was acquired by Sunrise Mines, Inc., 416 Electric Building, San Diego. In 1933 the Sunrise Group consisted of 15 claims and was operated by Sunrise Mines Inc. along with the Zulu and Moose groups (see herein) and the Cortez group of 3 claims whose location is undetermined. The main camp was just south of the Sunrise shaft and included an office, mess hall, assay office, bunkhouses, and mill which included two Straub 10-stamp mills. Sixty five gallons of water per minute were pumped from Sunrise Well, one mile to the south. In 1939 the Sunrise Mine was under lease to Pinto Basin Mining and Milling Company who were remodeling the mill to do custom work. Four men were employed (Tucker and Sampson, 1940, p. 52-53). This lessee treated custom ore until closed by War Production Board order L-208 in 1942 (Tucker and Sampson, 1945, p. 143-144). The mine was idle in 1945 and by 1958 all buildings and equipment had been removed from the vicinity of the Sunrise shaft.

Production: U. S. Bureau of Mines records credit Sunrise Mines, Inc. with 67.51 ounces of gold and 28 ounces of silver from 218 tons of ore in 1933 and 71 tons of ore in 1941 yielding 15 ounces of gold. Whether this production was from the Sunrise shaft, or from other operations of the Sunrise Mines Inc. is not known.

References: Tucker and Sampson, 1940, p. 52, 53;
Tucker and Sampson, 1945, p. 143-144.
C.H.G. 5/16/61.

Summit Group

See Rusty Gold (Sunset Group) mine.

Sunset Group

See Rusty Gold (Summit Group) mine.

Sunset Mine

See North Star mine.

Sunrise Mine

See; Tulu Queen Mine.

Tingman-Holland Mine

See: Pinyon mine.

Thelma Group

See Meek Mine and Desert Gold Group.

Top of the World (Victor, La Plomo, Steele) Mine

Location: SE $\frac{1}{4}$ sec. 32, T. 4 S., R. 4 W. and NE $\frac{1}{4}$ sec. 5, T. 5 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7 $\frac{1}{2}$ ' 1953; on the north edge of Steele Valley about 5 miles west of Perris, *(Perris)*

Ownership: Nolan F. Fultz, P.O. Box 175, Perris.

History: The Top of the World Mine was first developed prior to 1888 but the date of location was not determined. By 1888 much of the present development had been accomplished under the ownership of H. C. Steele (Goodyear, 1888, p. 527). The mine was idle when reported on in 1894 (Crawford, 1894, p. 225). Still owned by H. C. Steele, the "Victor Mine" was again reported idle in 1896 (Crawford, 1896, p. 314). The Top of the World Mine was reported active in 1935 when Calbert and Fultz were the owners (Sampson, 1935, p. 514-515). Apparently the mine was worked on a small scale from 1933-1938 but by 1945 the mine was again idle (Tucker and Sampson, 1945, p. 144, pl. 35). At present (1959) only assessment work is being done.

Geology: The workings of the Top of the World Mine lie athwart a low ridge (fig. ___/) underlain by diorite and a small pendant of quartz-mica schist which strikes N. 10° W. and have^S a generally vertical dip. At least[^] 2 aplite dikes cut both the diorite and metamorphic rocks.

Judging from the arrangement of the workings and some of the older reports it appears that the vein lies at or near the igneous-metamorphic contact for at least part of its explored extent. It is poorly exposed at the surface but appears to strike about N. 20° E. and dips about 45° NW. The vein is reported to range from 0 to 3 feet in thickness and is composed of crystalline quartz carrying unevenly distributed gold and silver-bearing galena. Ore from one chute (fig. ___/) has assayed as high as \$1,000 in gold and twenty-five ounces of silver per ton (Goodyear, 1888, p. 527; Storms, 1893, p. 384)Ⓢ however, an average based on 1933-1938 production figures,
 would be roughly \$48 in gold and 2.4 ounces of silver per ton (U. S. Bureau of Mines files).

Development: The mine (plate ___/) was developed through a main inclined shaft 175 feet deep and three shallower inclined shafts two of which are now (1959) largely filled. Lateral development was accomplished on the 60, 120, and 175-foot levels the lowest level opening to an adit driven north from the south slope of the ridge to ventilate and drain the mine. An ore chute was stoped between three raises at the southwest end of the 60-foot level.

Plate ___/ is a rough sketch of the workings in the plane of the vein, and figure ___/ is a photo of the surface. The head frame stands over an inclined shaft in the hanging wall which was sunk by the present owner to avoid the caved upper part of the old main shaft, the caved collar of which lies in the pit to the right of the head frame in the photo.

Production:

During the years 1933 to 1938 the top of the World mine yielded about 46 tons of ore from which about 24 ounces of gold and 12 ounces of silver were recovered.

References: Goodyear, 1888, p. 527; Storms, 1893, p. 384; Crawford, 1894, p. 225; 1896, p. 314; Merrill and Waring, 1917, p. 531-532; Tucker and Sampson, 1929, p. 489; 1945, p. 144, pl. 35; Sampson, 1935, p. 514-515; Goodwin, 1957, p. 607-608.

R.B.S. 9/24/59.

Triangle (Pilot) Mine

Location: Sec. 1, T. 7 S., R. 15 E., S.B.M.,
U. S. Army Corps of Engineers Chuckwalla Mountains
quadrangle, 15', 1945; in the Chuckwalla Mountains
at the mouth of a canyon which drains the north slope
of Pilot Mountain, about $2\frac{1}{2}$ miles south and east of
Aztec Well. An unimproved dirt road extends southward
from Aztec Well to the mine.

Ownership: Not determined (1959).

History: The only published description of the
Triangle (Tucker and Sampson, 1929, p. 489) reported
it to be owned by Wm. B. Krosse, J. M. Halloway and
C. A. McGraw who lived at Aztec well.

Geology: A fault is exposed for about 200 feet
along the east flank of a ridge. The fault zone is
as much as 3 feet wide and is mineralized by a quartz
vein which reaches a maximum width of about 2 feet.

Fractures and pockets in the vein are filled with
oxides of iron and traces of secondary copper minerals.
The fault strikes N. 45° E., and dips 40° NW. The country
rock is gneissic granite.

Development: The Triangle mine consists of 3 inclined shafts, 2 open-cuts, and an adit. The shafts are about 70 feet apart along the exposed extent of the vein. The northwest shaft is roughly 100 feet deep, the middle shaft is 35 feet deep, and the southeast shaft is blocked by caving at a depth of 20 feet. The two open-cuts adjoin the portals of the northwest and central shafts. In addition, drifting extends 30 - 40 feet southeast from the central shaft. Two short raises connect this drift with the surface. The adit was driven to crosscut the vein from a point about 40 feet down slope and northeast of the middle shaft.

Production: The total yield of the Triangle was not determined. Tucker and Sampson (1929, p. 489) stated that one ton of sorted ore was treated in an arrastra^c at Aztec Well and that \$125 in gold was recovered.

References: Tucker and Sampson, 1929, p. 489;
Tucker and Sampson, 1945, pl. 35 (mislocated).
R.B.S. 5/1/59.

Twin Buttes #1 Mine

Location: SE $\frac{1}{4}$ sec. 18, T. 5 S., R. 2 W., S.B.M.,
Winchester quadrangle, 7.5', 1953; about one mile southwest
of Homeland at the northwest end of a shallow, southeast
draining canyon.

Ownership: Undetermined.

History: This was one of ⁷seven unpatented claims
located in 1935 by Don F. Hays. Previously this claim
had been held by Menifee Wilson who did most of the
development.

Geology: Two en echelon shear zones, which strike east
and dip 80° N., are exposed through a distance of about
200 feet on a knoll underlain by diorite. The planes of
these shears contain lenticular bodies of milky vein quartz
ranging from 0 to 4 feet in thickness. The quartz is
highly fractured and sheared and resulting fissures and
cavities are filled with oxides of iron.

Development: The west vein is explored by a 6-foot
pit, a 60-foot shaft, is crossed by a trench 60 feet long,
and, at its eastern extreme, by a prospect pit and a
second shallow trench. The east vein is explored by a
60-foot shaft joined at the 15-foot level by a 30-foot
adit driven west on the shear.

Production: Undetermined. Idle (1959).

References: None.

R.B.S. 9/22/59

Twin Buttes #2

Location: SE $\frac{1}{4}$ sec. 18, T. 5 S., R. 2 W., S.B.M., Winchester quadrangle, 7 $\frac{1}{2}$ ', 1953; one mile southwest of Homeland. This unpatented claim lies in a saddle where a trail (see quadrangle map) crosses a north-east-trending ridge.

Ownership: Mrs. Mayme J. Hays, Route 1, Box 193, Romoland.

History: This is one of seven claims located by Don F. Hays in 1935. The date of its development was not determined.

Geology: A vertical shear zone as much as 4 inches wide strikes N. 40° W. across ~~the~~ diorite ridge. Though poorly exposed, the shear zone appears to converge with an aplite dike about 15 feet wide which strikes N. 70° W. and which is well exposed on the ridge. A thin vein of iron-stained quartz lies in the shear zone. It carries free-milling gold. As presently exposed the vein exceeds an inch in thickness in only a few places.

Development: A 50-foot drift adit follows the shear zone to within an estimated 30 feet of its junction with the dike.

Production: None.

References: None.

R.B.S. 9/22/59.

Unknown Mine

Location: NW cor. sec. 34, T. 2 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree National
Monument, 1 3/4 miles southeast of Ryan Campground in
a valley between Lost Horse Mountain and Ryan Mountain.

Ownership: Undetermined (1960).

History: Undetermined, but apparently a very old
working and long idle.

Geology: Aplite dikes in thin banded quartz-biotite
gneiss (Pinto gneiss). Where exposed in the shaft the
dikes strike N. 10° E. and are vertical. The largest
dike is 10 inches wide at the surface but shrinks to 6
inches at a depth of 20 feet; a second dike is 4 inches
thick at the surface, and there are several thin dike
stringers. The dikes are not exposed at the surface
beyond the shaft.

Development: One vertical shaft of unknown depth.

Production: Undetermined.

References: None.

C.H.G. 1/28/60.

Unknown Mine

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 4, T. 3 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; in the central
part of the Lost Horse Mountains on a ridge half a mile
northwest of the Lost Horse Mine.

Ownership: Undetermined.

History: Undetermined. Probably the exploratory work
was in connection with the Lost Horse Mine (see herein)
in the 1890's.

Geology: Quartz veins occur in shear zones in banded
quartz-biotite gneiss (Pinto gneiss). Two principal
quartz veins have been explored: one strikes N. 20° W.,
dips 70° NE., is solid, and one foot thick; 50 feet to
the northeast is a 5- to 6-foot wide sheared vertical
quartz vein which strikes north. The vein quartz shows
very little iron oxide stain and no sulfides.

Development: The vertical vein is explored by an
adit, now caved, and an inclined shaft is sunk on the
inclined vein. The shaft apparently is shallow, but the
adit, as indicated from the size of the dump, may have
at least 100 feet of workings.

Production: Undetermined.

References: None.

C.H.G. 6/20/57.

Undetermined

~~Undetermined~~ Mine

Location: Sec. 8 (?), T. 3 S., R. 10 E., S.B.M. (proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, about 4½ miles southeast of White Tank, and about ½ mile south of the West Pinto Basin Road (see pl. 2/).

Ownership: Undetermined.

History: Undetermined.

Geology: Blue-gray quartzite and quartz-muscovite schist (part of the Pinto Gneiss) is cut by a northwest-trending and 65° southwest-dipping fault. The fault *is marked by* (contains) a 2 to 5-foot wide breccia-gouge zone which contains thin quartz stringers (fig. 1/).

Development: A drift adit is driven 100 feet northwest in the fault plane. Forty feet from the portal a winze is sunk to the 30-foot level in the plane of the fault. From this point a drift extends northwest 18 feet. A few tens of feet west of the adit portal a pegmatite body and thin quartz stringers have been explored by means of a 20-foot vertical shaft (fig. 1/). The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 1/25/60

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Figure 1/. Sketch map showing the areal distribution of the workings (A), and a geologic sketch map (B) of the undetermined mine (topography from U.S.A.C.E. 15' Pinkham Well quadrangle, 1943).

^{identified}
~~Undetermined~~ Prospect

Location: Sec. 16 (?), T. 2 S., R. 12 E., S.B.M.
(proj.), U. S. Army Corp of Engineers Eagle Tank quad-
rangle, 15', 1943; Pinto Mountains, about 3 miles
northwest of Mission and Sunrise Wells (see pl. 3/).

Ownership: Undetermined.

History: Possibly part of the work ^{was}/done by the Sun-
rise Mines Inc., San Diego, during the 1930's (see
Sunrise Mine description).

Geology: Several steeply dipping milky quartz veins,
as much as 1-foot thick, cut massive quartz monzonite.
In the prospect area the veins are semi-parallel and
tend generally west.

Development: A few shallow shafts, one about 20 feet
deep, are sunk on the veins. The mined quartz has been
piled near the pits and apparently contained no values.
The mine access road is narrow and poor.

Production: None.

References: None.

J.R.E. 3/30/60

Unknown Mine

Location: NE¹/₄NE¹/₄ sec. 33, T. 2 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree
National Monument, 1¹/₂ miles south of Ryan Campground
and Lost Horse Well, on the northeast slope of the Lost
Horse Mountains.

Ownership: Undetermined.

History: Undetermined, apparently long idle.

Geology: Quartz veins in gneissic quartz monzonite
(Pinto gneiss). One vein, exposed in an open trench near
the crest of the hill, strikes N. 60° E., dips 65° NW.,
and has been trenched laterally for about 50 feet.
A second vein, exposed at the portal of the adit below,
strikes N. 45° W., dips 70° SW., and is as much as 3 feet
wide. Other thin quartz stringers intersect the trend
of this vein at right angles. The dumps contain small
amounts of yellow-brown iron oxide stained vein quartz.

Development: The quartz vein near the hilltop has been explored by a narrow trench about 50 feet long and 10 to 15 feet deep, and a shaft inclined 65° NW. is sunk from the bottom of the trench. About 300 feet to the southeast and 175 feet below the trench and shaft an adit is driven N. 45° W. The size of the dumps suggests several hundred feet of underground workings, and the shaft and adit may join. The workings are reached by means of a quarter of a mile of foot trail from the end of the Jeep road in the valley to the east.

Production: Undetermined.

References: None.

C.H.G. 5/19/61.

Unknown Mine

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 10, T. 3 S., R. 8 E., S.B.M.,
Lost Horse Mountain quadrangle, 1958; Joshua Tree National
Monument, about 1 mile south of the Lost Horse Mine near
the crest of Lost Horse Mountain on its southwest flank.

Ownership: Undetermined (1957).

History: Undetermined, but apparently an old property
long inactive.

Geology: The mine workings explore quartz-bearing
shear zones in banded quartz-biotite gneiss (Pinto
gneiss). There are two principal shear zones, about 100
feet distant. One shear zone strikes north, dips 80° W.,
and contains thin quartz stringers; the second shear zone
strikes N. 25° W., is vertical, and contains reddish-
brown iron-stained vein quartz as much as 1 foot thick.
This quartz vein is exposed discontinuously at the
surface for about 400 feet.

Development: A vertical shaft (100 $\pm$ feet deep) is sunk
on the 400-foot quartz vein, and this vein is explored
by shallow pits and trenches for about 150 feet. A short
adit is driven on the other quartz vein, and shallow pits
explore several tiny quartz outcrops in the area.

Production: Undetermined.

References: None.

C.H.G. 6/20/57.

Victor Mine

See Top of the World Mine.

Vidal Lime Claim

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 19, T. 1 S., R. 24 E., S.B.M., Vidal quadrangle, 1950; at the north end of the Riverside Mountains, 2 $\frac{3}{4}$ miles south of Vidal.

Ownership: Jack Stewart, General Delivery, Parker, Arizona; 8 claims, leased to Jack Gordon, Wendon, Arizona (1957).

History: This mine was operated for a short time during 1957 by H. G. Smith, Box 416 Buckeye, Arizona; possibly under lease from the present owner.

Geology: The rocks in the area of the ^{Vidal Lime Claim} ~~Lime mine~~ are platy gneiss~~es~~. The slopes near the mine are partially covered by thin deposits of travertine. A mineralized fault, bearing gold and rich in copper minerals, strikes N. 60° - 80° W. across the claims and dips 65° NE. Because of the travertine deposits and the irregular distribution of the ore, the fault is not traceable for more than a few tens of feet in any exposure. Minerals identified are chrysocolla, malachite, quartz, and hematite. They occur in pods and lenses as much as 6 feet in width.

Development: This deposit is explored by 2 shafts. One is inclined steeply along the fault and the other, a few feet away, is vertical, apparently affording access to the inclined shaft. The depth of these shafts was not determined. An adit of unknown length has been driven northwest into the side of a shallow canyon just south of the main site, and a shallow prospect trench is cut in the north facing slope at the main site.

Some new timber has been applied to the shafts, the vertical one being newly covered. No equipment was on the property when visited (December 1957).

Production: During 1957 this mine was reported to have yielded 116 tons of ore from which 4 ounces of gold, 5 ounces of silver, and 1,479 pounds of copper were recovered. *(U.S. Bureau of Mines No. 2)*

References: None.

R.B.S. and C.H.G. 12/20/57

Virginia Shay Mine

See Virginia Mine.

Virginia (Missing Link, Virginia Shay) Mine

Location: NE $\frac{1}{4}$ sec. 32, NW $\frac{1}{4}$ sec. 33, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7.5', 1953; at the junction of Santa Rosa Road and an unimproved dirt road which extends southward to Steele Valley. This point is about 5 $\frac{1}{2}$ miles, by road, west of Perris. (1)

Ownership: Undetermined.

History: The Virginia mine was first reported under development in 1893 (Storms, p. 385). Active mining was first noted by Crawford (1894, p. 225), a shaft 200 feet deep having been sunk by the owner Jerry Shey, a resident of Perris. The mine was idle in 1895 and 96 at which time it was owned by J. B. Dennis, Perris (Crawford, 1896, p. 313), and appears to have remained inoperative through 1929 (Merrill, 1917, p. 532; Tucker, 1929, p. 485) having then passed into the ownership of Hugh Duff, 626 Wesley Roberts Building, Los Angeles. From 1930-1931 the property was leased to H. L. Musick, 2336 Whittier Boulevard, who sunk a shaft on a new vein (Tucker, 1945, p. 138-139). Frank W. Kitchen, 230 E. 3rd Street, Perris, who worked in the mine during that period, states that this shaft was sunk to explore a vein which had been discovered by core drilling. The drill had cut the vein at a low angle giving a false measure of its thickness.

Geology: Deeply-weathered dioritic country rock is cut by two quartz veins, each as much as 3 feet wide. The spatial relationship of the veins is not evident on the surface but judging from the position of the shafts they are as much as 200 feet apart and roughly parallel. Attitudes given in a previous report (Tucker, 1945, p. 138-139) are N. 75° E., 56° SE. for the north vein and N. 50° E., 60° SE. for the south vein. They average from \$8 to \$10 per ton in gold.

Development: The old shaft is on the south vein. It is low on a slope on the south edge of the property. It is reported to be 200 feet deep but this was not verified. According to Mr. Kitchen the shaft which was sunk to explore the north vein reached a depth of 240 feet, and there is a 75-foot drift northeast at the 50-foot level and a 150-foot drift at the 175-foot level. Operations were terminated owing to an excess of water.

Production: Undetermined.

References: Storms, 1893, p. 395; Crawford, 1894, p. 225; Merrill, 1917, p. 532; Tucker, 1929, p. 485; Sampson, 1935, p. 513; Tucker, 1945, p. 138-139.

R.B.S. 6/18/59

Walker Claim

See Lucky Boy.

1736-

Washington Mine

Location: NE $\frac{1}{4}$ sec. 24 (proj.), T. 4 S., R. 5 W., S.B.M., Steele Peak quadrangle, 7.5', 1953; 7 miles west of Perris and a quarter of a mile southeast of Hartford Springs.

Ownership: Undetermined.

History: Last reported activity was in 1940 and 1941 by Vern W. Decker, Perris (U. S. Bureau of Mines files).

Geology: Deeply weathered diorite is cut by a fault which strikes N. 10° W., and dips 40° SW. The fault plane comprises a shear zone as wide as one foot sparsely mineralized with quartz veins ranging from a fraction of an inch up to 3 to 4 inches in thickness. Fractures and small cavities in the quartz contain iron oxides and free^e_A-milling gold. The vein is poorly exposed on the surface.

Development: The fault is explored by two inclined shafts approximately 70 feet apart. The more northerly shaft is timbered and open to 50 feet, below which it is flooded. Its total depth or lateral development was not determinable. The other shaft is caved.

Production: According to U. S. Bureau of Mines records, during 1940 and 1941 this mine yielded 31 tons of ore from which 2 ounces of gold and one ounce of silver were obtained.

References: None.

R.B.S. 6/16/59.

White Owl Group

See: Morning Star Mine.

White Wings Claim

See Red Cloud Group.

Zulu Queen Mine

Location: Sec. 15, T. 2 S., R. 13 E., S.B.M. (proj.).
Dale Lake quadrangle, 1956; Pinto Mountains, Joshua Tree
National Monument, about 6 miles northeast of Sunrise Well.

Ownership: Undetermined.

History: The Zulu Queen mine is one of 3 mines owned
by the Sunrise Mines Inc., 726 Electric Bldg., San Diego,
in the 1930's. In 1933 the property consisted of the
Zulu Group of 11 unpatented claims (Tucker and Sampson,
1945, p. 143). The mine was worked intermittently from
1933 to 1933 (see Sunrise mine description).

Geology: A major shear zone as much as 12 feet wide
cuts quartz monzonite. The shear zone trends north,
dips vertically, and contains gold-bearing quartz veins
and lenses that range from a few inches to 18 inches in
thickness.

Development: A vertical 2-compartment shaft is sunk 100 feet in the shear zone. On the 50-foot level there is a drift 175 feet south, and on the 100-foot level there is a drift 75 feet south (Tucker, 1933, unpublished Field Report No. 121). Directly south of the headframe of the shaft, and at the same elevation, an adit is driven 110 feet southward in the shear zone. A vertical winze connects to the 50-foot level about 85 feet from the portal. At 110 feet another nearly vertical winze extends to the first level. Water was obtained from Sunrise Well about 6 miles southwest. The dirt road which connects the well with the mine is in part good, but generally in very poor condition. The mine is at an elevation of 1700 feet and low on the northeast slope of a small hill near the mouth of a wash which drains the Pinto Mountains from the north. It is idle.

Production: In the years 1934 to 1938 the
Zulu^u Queen mine yielded some 112 tons of ore from which
38 ounces of gold and 7 ounces of silver were recovered.

References: Tucker, 1933, Unpublished Field Report
No. 121; Tucker and Sampson, 1935, pp. 143-144, pl. 35.

J.R.E. 3/10/60.

Gypsum

Gypsum

Gypsum

The principal source^s of gypsum ($\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$) in Riverside county has been the upper Paleozoic (?) Maria formation (Miller, 1944, p. 25), exposed in the Riverside Mountains, Big Maria Mountains, Little Maria Mountains, and the north end of the Palen Mountains in the eastern part of the County. In all the above areas except the Little Maria Mountains there has been essentially no gypsum mining although deposits of potential commercial grade have been prospected since early in the present century.

From 1925 to 1940 the United States Gypsum Company plant in the Little Maria Mountains was the largest single source of gypsum products in California. Production has since remained about the same but the operation has been overshadowed by the exploitation of deposits in other counties (Ver Planck, 1952, p. 13).

Gypsiferous material to be used as a soil conditioner has been taken from the deposit in the Little Maria Mountains (Ver Planck, 1952, p. 105), in Riverside County but most of such gypsum (gypsite) has been mined in the western part of the county.

Gypsum (Gypsite)

Gypsite, an earthy mixture of very small gypsum crystals with clay and sand or other impurities, has been mined in an area that lies along the northeast flank of the Santa Ana Mountains about 4 miles south and southwest of Corona. There a narrow, irregular belt, averaging about 500 feet in width but as much as 3,000 feet wide containing rather low-grade gypsite extends for about $3\frac{1}{2}$ miles in a northwesterly direction between Joseph and Tin Mine canyons. The gypsite comprises a mixture of altered volcanic rock (hornblende andesite of the Jurassic Santiago Peak volcanics) and gypsum. Although the gypsum content is only between 20 and 30 percent, the material carries enough iron and lime to make it of value as a soil conditioner (Ver Planck, 1952, p. 58). Exploitation of the Corona deposits has been sporadic and most of the mining took place from 1909-1934, with most of the material used locally by orchardists. Production of gypsite from the Corona area for agricultural use is hindered because agricultural gypsite must generally contain more than 50 percent gypsum.

Small quantities of gypsite are said to have been taken from fluvial deposits at the south end of the Palen Mountains for use in the Blythe area (see herein under Iron Cap and Iron King claims).

Barth (Prizer) Deposit

Verplanck S.

Location: Undetermined (1961). Ver Planck (1952, p. 124) lists the property in sec. 2, T. 4 S., R. 7 W., S.B.M. This is a doubtful location because section 2 is wholly covered with older alluvium. This location may have been for a grinding or storage area; the gypsum probably was obtained from the Eagle Canyon-Tin Mine Canyon gypsite belt in the nearby Santa Ana Mountains.

Ownership: Undetermined (1961).

History: Operation was by H. A. Prizer in 1909 and W. C. Barth in 1914.

Geology: Undetermined.

Development: Undetermined.

Production: Small production of gypsite for agricultural use was reported in 1909, 1914, and 1917.

References: Merrill, 1917 [1919], p. 579; Ver Planck, 1952, p. 124-125; Gray, 1961, p. 115.
C.H.G. 3/2/61.

Big Chief (Freeman-Nonhof, White Gypsum Group,
Ware) Deposit

Location: SE $\frac{1}{4}$ sec. 9, SW $\frac{1}{4}$ sec. 10, T. 4 S., R. 7 W.,
S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern
flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of
Corona, on the south side of Tin Mine Canyon.

Ownership: P. E. Coleman, 301 Fruit Street, Santa
Ana, owns the Big Chief placer claim of 20 acres (1957).

History: In 1923 G. R. Freeman and E. R. E. Nonhof,
Corona, did some development work. The property was
leased to Dr. Leon N. Katz, 9837 Foothill Blvd., San
Fernando in 1943 when bulldozer cuts were made and some
sampling was done. In 1947, the property was held by
Howard S. and Irene J. Ware, 219 East Olive Street,
Corona. Mr. Coleman located the property in 1954 and in
1956 limited trenching and sampling were done. This area
was formerly part of the White Gypsum Group (see herein).

Geology: See White Gypsum Group herein.

Development: Several short adits 10 to 30 feet long
and shallow open cuts.

Production: See White Gypsum Group herein.

References: Gray, 1961, p. 115.

C.H.G. 3/3/61.

Capitol Dome Group

See: Main Street (Gypsum) Canyon deposit.

Eagle Canyon (Frazer) Gypsum Deposit

Location: Lots 1 and 2, SW $\frac{1}{4}$ sec. 13; N $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 24, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 4 miles south of Corona along both sides and west of the mouth of Eagle Canyon.

Ownership: T. A. and F. M. Frazer, 718 Howard Street, Corona, own three unpatented placer claims: Eagle Group, Eagle Group No. 2, and Eagle Group No. 3, totaling about 150 acres (1957).

History: The Eagle Canyon deposit was mined for agricultural gypsum from 1913 to 1917. Other than assessment work the property has apparently since been idle except during 1943-44 when Dr. Leon Katz mined about 1,000 tons of gypsite. This material was used only for testing and experimental purposes. A small crushing plant was also installed in 1943-44 but proved unsatisfactory and was removed in the early 1950's.

Geology: Gypsite occurs as a network of narrow, closely spaced, satin spar veinlets in zones of hydrothermally altered dacites and andesites of the Jurassic(?) Santiago Peak Volcanics. The gypsiferous zones strike about N. 70° W. and lie along or near the Elsinore fault zone. The gypsite belt, which is as much as 500 feet wide, occurs on both sides of Eagle Canyon and crops out sporadically for a lateral distance of nearly 1,500 feet across the ridge to the next small canyon to the west (Manning Canyon). Tucker and Sampson (1945, p. 168) report the gypsum content ranges from 15 to 25 percent. However, Dr. Katz reports that most of the material has a gypsum content of only about 15 percent (Gray, 1961, p. 83).

Development: Short adits, shallow open cuts, and prospect pits. On the west side of Eagle Canyon an adit is driven west 80 feet; about 200 feet south of this adit there is an open cut 70 feet in length; on the west side of Manning Canyon an adit has been driven west 100 feet (Tucker and Sampson, 1945, p. 168). The most recent development was done in 1943-44 along the east side of Eagle Canyon and consisted of an adit driven southeast 20 feet and an open cut 60 feet in length and 15 feet in depth.

Production: Small recorded production of gypsite, 1913-1917.

References: Merrill, 1917 [1919], p. 579; Tucker and Sampson, 1945, p. 168; Ver Planck, 1952, p. 58, 125, 132; Gray, 1961, p. 83-84, 115.
C.H.G. 8/17/62.

Elki Claims

Location: SW $\frac{1}{4}$ sec. 10, T. 4 S., R. 7 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank
of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of
Corona, on the south side of Tin Mine Canyon.

Ownership: George S. Jones, 3262 Santa Ana Street,
South Gate (1957).

History: Mr. Jones located three claims (Elki 1-3) in
1956. Formerly part of White Gypsum Group (see herein).

Geology: See White Gypsum Group herein.

Development: Open trenches and one 30-foot adit.

Production: See White Gypsum Group herein.

References: Gray, 1961, p. 115.

C.H.G. 3/3/61.

El Cerrito Ranch

Location: Undetermined.

Ownership: Undetermined.

History: A small tonnage of gypsite is reported to have been produced in the period 1915-1917 for private agricultural use. This gypsite probably was mined from the Eagle Canyon - Tin Mine Canyon gypsite belt about 3 miles south and southwest of Corona in the Santa Ana Mountains.

References: Merrill, 1917 [1919], p. 579; Ver Planck, 1952, p. 135; Gray, 1961, p. 115.

C.H.G. 3/3/61.

gypsum

Freeman-Nonhof Deposit

See: White Gypsum group and Big Chief *deposits*

Frazer Deposit

See: Eagle Canyon gypsum deposit.

Garland Deposit

See: Maria Mountains Deposits.

Garbutt and Orcutt Deposit

See: Maria Mountains Deposits.

Hagador Canyon Gypsum Deposit

Location: NW $\frac{1}{4}$ sec. 15, S $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 10; NE $\frac{1}{4}$ sec. 16, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 4 miles southwest of Corona, along Hagador Canyon and the ridges on both sides of the canyon.

Ownership: W. R. and Virginia Adams, 301 Fruit Street, Santa Ana, own two unpatented placer claims located in 1952: Farmer's Friend Nos. 1 and 2 (1957). In 1956 Orrin M. Pierce, 1607 North Flower Street, Santa Ana located two placer claims, Alpha and Omega in secs. 9, 10, 15, 16; and A. F. Bullard and William Redding, 1003 South Pacific Avenue, San Pedro also located two placer claims, Red Bull No. 2, (S $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 10) and Red Bull No. 3 (NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 15).

History: The earliest recorded operation was in 1910 and the deposit was later mined in 1915, 1916, 1924, and 1926-34. During the 1926-34 operation by E. R. E. Nonhof a crushing and screening plant with a reported capacity of 40 tons per day was erected in upper Hagador Canyon. Collapsed remains of this plant remained on the property in 1956, but there is no known production since 1934.

Gypsum Canyon Deposit

See: Main Street Canyon gypsum deposit.

Development: Several large adits and open cuts and trenches, together with a number of shallow open cuts and short adits. In 1956 the open cuts and trenches were caved and the principal adits were inaccessible because of standing water and caving. The area is overgrown with brush so that the gypsite-bearing zones are very poorly exposed.

Production: Undetermined, but this property probably has been the principal source of agricultural gypsite in the Corona area. The output was sold as a soil conditioner to growers in southwestern Riverside County.

References: Merrill, 1917 [1919], p. 579; Symons, 1928, p. 269; Symons, 1935, p. 279; Tucker and Sampson, 1945, p. 168-169; Ver Planck, 1952, p. 57-58, 126, 132, 142, 149; Gray, 1961, p. 84-85, 115.

C.H.G. 8/17/62.

Geology: The gypsum occurs in hydrothermally altered metavolcanic rocks of the Jurassic(?) Santiago Peak Volcanics, and is similar to the Eagle Canyon deposit (described herein). The gypsum-bearing zone strikes northwestward and lies along the southwest side of the Elsinore fault in rugged, brush-covered foothills of the Santa Ana Mountains. Along Hagador Canyon the gypsum-bearing zone is about 3,000 feet wide, but to the northwest narrows to about 1,500 feet on the south side of Tin Mine Canyon, where it apparently terminates. Tucker and Sampson (1945, p. 169) report the gypsite beds are about 200 to 300 feet in width and about 750 feet in length in secs. 10 and 16 astride Hagador Canyon, with the principal exposure on the west side of the canyon. To the southeast, along the east side of Hagador Canyon, Tucker and Sampson (1945, p. 166) report an exposure of clay (probably altered volcanic rock along a shear zone) that contains 25 to 37 percent gypsum. This gypsum-bearing zone is about 600 feet wide and 1,500 feet long. To the southwest, along the west branch of Hagador Canyon in the NE $\frac{1}{4}$ sec. 16, is exposed a gypsite body several hundred feet thick.

Jameson Deposit

Location: Sec. 3(?), T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954. Location of deposit, given by Ver Planck (1952, p. 126) as sec. 3, is doubtful because the only gypsum found there today is a very minor amount associated with clay shales of the Paleocene Silverado Formation.

Ownership: Undetermined.

History: W. H. Jameson Company, Corona, is reported to have produced a small amount of gypsite in 1915 for private use on orchards. Probably the gypsum was mined from the Eagle Canyon-Tin Mine Canyon gypsite belt, about 3 miles south and southwest of Corona in the Santa Ana Mountains.

Geology: Undetermined.

Development: Undetermined.

References: Merrill, 1917, 1919, p. 579; Ver Planck, 1952, p. 126, 138; Gray, 1961, p. 115.
C.H.G. 3/3/61.

Langdon Deposit

See: Maria Mountains Deposits.

Main Street (Gypsum) Canyon Gypsum Deposit

Location: S $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 15; N $\frac{1}{2}$ S $\frac{1}{2}$ sec. 14, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 4 miles south of Corona along Main Street (Gypsum) Canyon and adjoining ridges.

Ownership: Mrs. Josephine Middlesworth, 847 W. 9th Street, Corona, owns one unpatented placer claim (Morning Star) in the S $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 15 (1957). Floyd N. Champion, et al., 3316 E. Anaheim Street, Long Beach, own five unpatented placer claims (Capitol Dome 1-5) covering about 75 acres in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 14, T. 4 S., R. 7 W., S.B.M. (1957).

History: This deposit was first worked about 1900 and was intermittently active on a small scale until 1937. It was further explored by several lessees during 1944-45 and apparently has since been idle.

Geology: The gypsum occurrence is similar to that of the Eagle Canyon deposit (described herein). Satin spar veinlets occur in metamorphosed Jurassic(?) Santiago Peak volcanic rocks along the Elsinore fault zone and in brown shales of the adjacent Silverado Formation. The main body of the deposit occurs along the west side of Main Street (Gypsum) Canyon and on the brush-covered ridge northwest toward Hagador Canyon. The gypsite-bearing zone is about 600 feet wide on the west margin of Main Street Canyon, but widens to nearly 1,500 feet on the ridge to the northwest. Tucker and Sampson (1945, p. 168) report that the exposed gypsite-bearing zone on the Morning Star claim was 700 feet in width. Several smaller exposures of gypsite lie on the east side of Main Street Canyon.

Development: Short adits, and shallow trenches, open cuts, and prospect pits.

Production: Undetermined intermittent production of gypsite for agricultural use by citrus growers in the vicinity of Corona during a period before 1901 until 1935.

References: Aubury, 1906, p. 286; Merrill, 1917 [1919], p. 579; Tucker and Sampson, 1945, p. 168; Ver Planck, 1952, p. 57-58, 126, 136, 140; Gray, 1961, p. 85-86, 115.
C.H.G. 8/17/62.

Maria Mountains Deposits

Location: Secs. 1, 2, 3, ^{and} 4 (proj.) T. 4 S., R. 20 E.;
secs. 30, 31, 34, ^{and} 35 (proj.) T. 3 S., R. 21 E.; and
secs. 5, 6, and 7 (proj.), T. 4 S., R. 21 E., S.B.M.,
Midland and Big Maria Mountains quadrangles, 1952, 1951;
on the west slope of the Big Maria Mountains and in the
southeast one-third of the Little Maria Mountains near
the town of Midland, 22 miles north-northwest of Blythe.

Ownership: United States Gypsum Company, 300 W. Adams
St., Chicago 6, Ill.

History: When the Maria Mountains gypsum deposits
were described by Merrill and Waring (1917, p. 577-579)
they were claimed by a number of interests. Subse-
quent changes are here outlined.

U. S. Bureau of Mines records show that the
United States Gypsum Company patented twenty-two, 20-acre
placer claims in the Little Maria Mountains and three,
20-acre, placer claims in the Big Maria Mountains in
1916. In the same year P.A. English, et. al. patented

five groups comprising forty, 20-acre claims, some in the Big Maria Mountains but principally in the Little Maria Mountains. About 1915, W. W. Orcutt, et. al., patented five placer claims in the northwest corner of the Little Maria Mountains gypsum bearing area comprising a total of 620 acres (Tucker and Sampson, 1929, p. 510; U. S. Bureau of ^{Land Management} ~~Mines~~ records).

In 1920 the U. S. Gypsum Company was reported to have completed extensive exploratory work in the Little Maria Mountains area (Tucker, 1920, p. 327), and by 1929 a plant had been built and extensive development accomplished. In 1937 underground mining was started on property shown as the "Brown Mine" on the Midland quadrangle. This operation was discontinued in 1949 because of more economical open pits which had been started in 1946 in the area marked "Victor Mine" on the map (personal communication, E. E. Sturrock, U. S. Gypsum Mine Superintendent).

In 1929 Messrs. Garland, C. M. Langdon and Ray T. Savage, of Los Angeles, held an unspecified number of claims on the west slope of the Big Maria Mountains. A small crushing plant was employed on the Savage property (Tucker and Sampson, 1921, p. 513) and evidence was found that a small plant had once been used on the White Elephant claim, held in 1932 by Langdon, in sec. 35, T. 3, S., R. 21E.

In the mid-30's U. S. Gypsum, through the patent of 19 more claims in the Little Maria and 8 more claims in the Big Maria areas and other transactions, acquired the Garland, Garbutt and Orcutt, Langdon, and Savage deposits (U. S. Bureau of Mines records; Tucker and Sampson, 1945, p. 170).

In 1945 U. S. Gypsum Co. engaged Utah Construction Company to explore the Garbutt and Orcutt property and, in 1947, mining was begun. In 1948 Utah Construction Company acquired an interest in the property. It was closed in June, 1950 (Ver Planck, 1952, p: 13-14).

As reported by Ver Planck (1952, p. 104), "The United States Gypsum Company's plant at Midland, Riverside County, began producing uncalcined gypsum products in 1928 in a plant that has since been enlarged." In September, 1958 the facility was improved by the completion of a natural gas line, north from the Blythe area. This will facilitate the continued manufacture of calcined gypsum products which

has been roughly doubled since its inception August 15, 1928 (Tucker and Sampson, 1929, p. 515). The products are wallboard, plaster lath and interior plasters. In 1945 the wallboard plant was reported (Tucker and Sampson, 1945, p. 172) to have a capacity of 100,000 square feet of 3/8-inch wallboard and lath; at that time claimed to be the largest such plant in the United States. Products manufactured in lesser quantities were wall plaster, and finishing and casing plaster. Agricultural gypsum and cement retarder were to have been added to the plants list of products but these are not now (1960) being produced.

-790-

Geology: In the Little Maria Mountains the area underlain by gypsiferous rocks is wedge-shaped, being about $2\frac{1}{2}$ miles long, $2\frac{3}{4}$ miles wide at the east end and 1 mile wide at the west end. The rocks strike east and northeast and dip steeply north and northwest. The only published geologic map of the deposit covers just its western half (Ver Planck, 1952, pls. 2 and 3). Here, four, generally traceable gypsum zones as much as 150 feet thick containing beds of gypsum ranging from 0 to 10 feet in thickness, are included in altered limestone formations about 1,000-feet thick exposed roughly parallel to the north and south margins of the area. Between the two belts of limestone the central or axial part of the area consists of an indefinite thickness of gypsiferous greenschist.

A quartzite unit about 550 feet thick and a limestone unit 800 feet thick are exposed between the north margin of the gypsum-limestone formation and an upfaulted granitic body. The gypsum-bearing rocks lie on undifferentiated metamorphic and granitic rocks along the south margin of the deposit. The gypsum bodies commonly are mixed with the associated rock types in a manner described in detail by Ver Planck (1952, p. 17) who states that anhydrite was found in the Utah Construction Company Quarry, is common in the U. S. Gypsum Company quarries to the east, and is thought to be the immediate source of the gypsum.

The structure of the deposit has been suggested to be an anticline (Merrill and Waring, 1917, p. 578-579), an overturned anticline or possibly an unfolded, homoclinal sequence (Ver Planck, 1952, p. 18), or an overturned syncline (Shklanka, personal communication 11/20/58). The latter worker, a student at Stanford University, probably has the greatest fund of evidence to support his theory but has not yet published (1960). The structure problem might be considered purely academic were it not for the obviously divergent alternatives offered regarding the accessibility of reserves at depth. As with the Palen Mountains deposit (see herein), the disturbed condition of these rocks makes estimation of reserves uncertain at best.

The gypsum-bearing rocks exposed on the west flank of the Big Maria Mountains appear to be the same as those described above. They strike generally eastward and dip north in what appears to be a homoclinal structure but careful geologic mapping of this area now being conducted by the U. S. Geological Survey is as yet only partially published (Hamilton, 1960, p. 277-278).

Development: Prior to the mid-1930's the deposits in the Big Maria Mountains had been developed on a small scale and have since been held as reserves by U. S. Gypsum Company. The Savage deposit was explored by a 40-foot adit (Tucker and Sampson, 1929, p. 513) and the White Elephant claim by three short, chambered adits.

By 1945 development at the Brown mine in the Little Maria Mountains comprised an open pit 500 feet long, 50 feet wide and 50 feet deep from the bottom of which 2 tunnels about 200 feet long had been driven southwest. Nearby, to the southwest, two adits had been driven on gypsiferous units 20 to 60 feet in thickness. The lower adit was 1 mile long. Stopes were run to the surface at 25-foot centers, the distance to the surface being about 400 feet. The upper adit appears to have been less extensive and to have been driven in a parallel bed of gypsum overlying and a short distance to the north of the lower adit (Tucker and Sampson, 1945, p. 171).

The present quarry, at the site of the former Victor Mine, includes an area of about 1 square mile and comprises several intercommunicating pits as much as 100 feet deep on some faces. Gypsum is drilled and blasted down from the quarry faces, loaded into trucks with power shovels and trucked to the nearby plant. Most of the impurities are eliminated by selective procedures in the quarry.

The Utah Construction Company quarry is in sec. 11, T. 4 S., R. 20 E. Here three beds of gypsum as much as 60 feet in thickness striking N. 25° E. and dipping 60° NW. are exposed in benches on a low hill. The quarry is an irregular area about 700 feet long and 500 feet wide (Ver Planck, 1952, p. 18-20).

Production: U. S. Gypsum data not available; Utah Construction Company is credited with about 60,000 tons of agricultural gypsum (Ver Planck, 1952, p. 105).

References: Spurr, 1911, p. 787-790; Merrill and Waring, 1917, p. 577-579; Stone and others, 1920, p. 78-79; Tucker, 1920, p. 327; Tucker and Sampson, 1929, p. 510-515; 1945, p. 170-172, pl. 35; Ver Planck, 1950, p. 227; 1952, p. 13-20; 1957, p. 224; Hamilton, 1960, p. 277-273.

R.B.S.

Morning Star Deposit

Location: NE¹/₄NE¹/₄ sec. 1, T. 23 E. (proj.), SW¹/₄SW¹/₄ sec. 31, T. 1 S., R. 24 E., and NW¹/₄NW¹/₄ sec. 6, T. 2 S., R. 24 E., S.B.M., Vidal quadrangle, 1950; on the northwest side of a narrow, northeast-trending canyon in the Riverside Mountains. The name Morning Star is used for convenience because part of this deposit is overlapped by a lode claim of that name (see herein under gold).

Ownership: Undetermined.

Geology: A gypsum unit of undetermined purity is exposed through a horizontal distance of about 3,500 feet and appears to be as much as 100 feet thick. It strikes northeast and dips about 40° NW. The gypsum weathers to a porous, tan surface but fresh material is white and fine grained. The rocks in the area are strongly sheared and locally ^{contorted} deformed. This deposit is probably similar to others in the region in which gypsum is interbedded with gypsiferous schist and quartzite. The overlying and underlying rocks are impure limestone and dolomite which form bold ridges and cliffs (fig. ___).

Development: None.

Production: None.

References: None.

R.B.S. 4/20/61.

Omei Claim

Location: S $\frac{1}{2}$ sec. 9, T. 4 S., R. 7 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank
of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona,
on the south side of Tin Mine Canyon.

Ownership: Mrs. B. I. Markwell, 1001 N. Lowell Street,
Santa Ana (1957).

History: See White gypsum group.

Geology: See White gypsum group.

Development: See White gypsum group.

Production: See White gypsum group.

References: Gray, 1961, p. 116.

C.H.G. 3/3/61.

Palen Mountains Gypsum Deposit

Location: NE $\frac{1}{4}$ T. 3 S., R. 18 E., S.B.M., Palen Mountains quadrangle, 1952; in Palen Pass between the north end of the Palen Mountains and the southeast end of the Granite Mountains, about 25 miles northeast of Desert Center.

Ownership: Undetermined.

History: The gypsum deposits in the Palen Pass area were first described by Harder (1910, p. 407-416). In 1920, Joe Montgomery, and associates were planning to develop the property as the Standard Gypsum Company (Tucker, 1920, p. 326-327) but appear to have dropped the project. About 1930 extensive holdings are reported to have been patented by John Webb and George Pepperdine and additional development done in 1949 by Webb and Fleetwood Lawton (Ver Planck, 1952, p. 21). No record that patents were granted was found however, and subsequent litigation suggests that they were denied. The remoteness of the deposit and legal difficulties appear to have discouraged exploitation.

Geology: The Palen Mountains Gypsum deposit includes several sequences of gypsiferous beds in a north-dipping, faulted homoclinal section of metamorphosed igneous and sedimentary rocks exposed in an area 3 miles long and 1½ miles wide in Palen Pass. The gypsum occurs as irregular, massive beds of white, finely crystalline rock of reportedly good grade, ranging from 0 to 150 feet in thickness, interbedded with marble or in thinly laminated gypsiferous epidotic schist and quartzite. Anhydrite is not common but its possible increase at depth has not been determined (Hoppin, 1954, p. 5-8). Deformation of these rocks has caused redistribution of gypsum by plastic flow with resulting thickening and thinning of units. Limestone units appear to have been more brittle. Isolated blocks and small fragments of limestone are commonly engulfed by gypsum. Thus the estimation of gypsum reserves and the mining of a pure product would be complicated.

Development: The deposit has been explored by means of several shallow adits and pits and extensive bulldozer cuts but apparently there has been no systematic development.

Production: Undetermined.

References: Harder, E. C., 1909, p. 407-416; Stone and others, 1920, p. 78; Tucker, 1920, p. 326-327; Tucker and Sampson, 1929, p. 510-514; 1945, p. 167, pl. 35; Miller, 1944, p. 28; Jenkins, O. P., and others, 1950, p. 227; Ver Planck, W. E., 1952, p. 21-24; 1957, p. 234; Hoppin, R. A., 1954, 25 pp.
R.B.S. 3/11/59.

Parkford Deposit

See: Riverside Mountains Deposits.

Prizer Deposit

See: Barth deposit.

Red Bull Deposit

See: Hagador Canyon gypsum deposit.

Riverside Mountains (Parkford) Deposits

Location: Secs. 6 and 7, T. 2 S., R. 24 E., S.B.M., Parker quadrangle, 1950 and Vidal quadrangle, 1950; on the east slope of the Riverside Mountains 6 miles south of Vidal.

Ownership: U. S. Government in part (Colorado River Indian Reservation), in part undetermined.

History: E. A. Parkford, Pacific Mutual Building, Los Angeles, and J. M. Wilson, Vidal, acquired an undetermined number of claims in sec. 7 prior to 1929 (Tucker and Sampson, 1929, p. 511). Subsequent reports (Tucker and Sampson, 1945, p. 167, pl. 35; Ver Planck, 1950, p. 227; 1952, p. 24; 1957, p. 234) mention or briefly describe these deposits but give no ownership data. Apparently this material has not yet been mined.

Geology: The schistose, quartzitic, gypsiferous and carbonate rocks underlying the east slope of the Riverside Mountains have been contorted, sheared and faulted but the full extent to which these features have complicated the gypsum deposits has yet to be determined.

The following data is from a report on the Parkford deposit ^{in sec. 7} (Tucker and Sampson, 1929, p. 511) by Smith, Emery & Company, Los Angeles.

The deposit underlies a hill 250 feet high, 400 feet wide and 700 feet long and is exposed on three adjoining hogbacks through an additional distance of about 600 feet. Gypsum beds of high purity as much as 50 feet in thickness interbedded with limestone strike north and dip 30° to 60° west. The proportion of limestone increases in the south end of the outcrop.

The Riverside Mountains deposit has been described (Ver Planck, 1952, p. 24) as comprising a 100-foot zone of coarsely crystalline white gypsum, interbedded with brown-weathering crystalline limestone and red quartzite, exposed through a distance of about half a mile. This deposit is in the west half of sec. 6.

Development: In 1929 the Parkford property had been developed by means of five adits 198, 40, 27, 26, and 20 feet long, and open cuts but activity was confined to assessment work (Tucker and Sampson, 1929, p. 511). The Riverside Mountains deposit development consists of short adits and shallow pits (Ver Planck, 1952, p. 24).

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 511; 1945,
p. 167, pl. 35; Ver Planck, 1950, p. 227; 1952, p. 24;
1957, p. 234.

R.B.S. (not visited)

Savage Deposit

See: Maria Mountains Deposits.

Tecumseh Group

Location: SW $\frac{1}{4}$ sec. 10, SE $\frac{1}{4}$ sec. 9, NW $\frac{1}{4}$ sec. 15, NE $\frac{1}{4}$ sec. 16, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, between Tin Mine and Hagador Canyons.

Ownership: Orrin M. Pierce, 1607 N. Flower Street, Apt. G, Santa Ana (1957).

History: Parts of former White Gypsum and Hagador Canyon deposits (see herein) were relocated about 1954 as 5 claims (Tecumseh, Minot, Why Not, Alpha, Omega).
Idle.

Geology: See White gypsum and Hagador Canyon deposits.

Development: See White gypsum and Hagador Canyon deposits.

Production: See White gypsum and Hagador Canyon deposits.

References: Gray, 1961, p. 116.

C.H.G. 3/3/61.

Ware Deposit

See: White gypsum group and Big Chief deposit.

White Gypsum Group (Freeman-Nonhof, Big Chief, Ware)

Location: SE $\frac{1}{4}$ sec. 9, SW $\frac{1}{4}$ sec. 10, NE $\frac{1}{4}$ sec. 16, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; north-eastern flank of the Santa Ana Mountains 3 $\frac{1}{2}$ miles southwest of Corona, on the south side of Tin Mine Canyon.

Ownership: P. E. Coleman, 301 Fruit Street, Santa Ana (1957).

History: Formerly a group of 8 unpatented claims (White Gypsum 1-8). The property was owned by G. R. Freeman and E. R. E. Nonof, Corona, in 1923 and a small production of gypsite was reported. About 1940 Howard S. Ware, Corona, acquired the property and it was leased in 1943 to Dr. Leon N. Katz, 9837 Foothill Blvd., San Fernando, who made some exploratory bulldozer cuts. In 1947, bulk sampling was done on the White Gypsum group, then known as Ware gypsum. The property was later abandoned and partly relocated in 1954-56 as Big Chief, Cmel, Tecunseh, and Elki (see herein).

Geology: Veinlets of satin spar and gypsite in hydrothermally altered volcanic rock (Santiago Peak Volcanics, largely hornblende andesite).

Development: Several small cuts, shallow pits, and short adits.

Production: Small production of gypsite reported in 1923. Most of the material was used locally as a soil conditioner, small amounts may have been shipped for agricultural use.

References: Ver Planck, 1952, p. 127, 142, 146;
Gray, 1961, p. 116.
C.H.G. 3/3/61.

Lead-Zinc-Silver

Lead, Silver and Zinc

The base metals, lead and zinc, and the noble metal silver, are here grouped under one heading because their ore minerals commonly are found together and, in Riverside County, these metals generally have been marketed as byproducts. Lead and silver have been mined for their own value in only three or four mines and even in such deposits these metals generally are accompanied by some other valuable metal such as copper or gold. Ore containing appreciable quantities of zinc has been encountered in only one mine, the Bald Eagle, although it has been reported from the Black Eagle mine and perhaps one or two other localities where it is of minor significance.

From 1891 to 1961 a total of 2,228,562 pounds of lead valued at \$341,975 was reported from Riverside County. The total value is based on a price per pound which has fluctuated from as low as three cents in 1932 to a high of 18 cents in 1947. In 1961 the price ranged between 10 and 11 cents.

The principal ore of lead is galena but many of the deeply weathered veins, exposed in the mines of Riverside County, contain appreciable proportions of secondary lead minerals of which cerussite is the most common. Wulfenite is fairly abundant in many mines, especially those in the Chuckwalla Mountains, but generally as small disseminated crystals. Pyromorphite is present in a prospect near the Red Cloud mine but it might be more common as it is easily confused with copper carbonate. All of the above minerals are heavy enough to appear as concentrates in most tabling or sluicing techniques and offer a source of revenue which should not be overlooked in a singleminded quest for the gold with which they commonly are found.

A total of \$127,248 worth of silver was reported from Riverside County mines between 1891 and 1961. Most of this metal came from gold mines where it was found mixed in the gold or disseminated in sulfides. The lead sulfide, galena, is a particularly common host to silver. The mineral argentite has been reported from the Homestake group (see under copper) and might be present in the Bald Eagle mine (personal communication, Danny G. Figueroa) but such ore minerals of silver appear to be uncommon in the metal-bearing veins of the county.

Except for 1,901 pounds of zinc reported in the 1951 yield of the Bald Eagle mine, zinc production in Riverside County has never been large enough to achieve the notice of market statisticians. The 1951 yield was from the mineral sphalerite.

Bald Eagle (Neal Group) Mine

Location: SE $\frac{1}{4}$ sec. 27 and NE $\frac{1}{4}$ sec. 34, T. 3 S.,
R. 21 E., S.B.M. (proj.), Midland quadrangle, 1952;
Mig Maria Mountains, about 3 miles northeast of
Midland.

Ownership: Undetermined.

History: In 1929 the property consisted of 2 claims
and was owned by Mr. Neal, Kingman, Arizona (Tucker and
Sampson, 1945 p. 491). Lead-silver-copper mineralization,
accompanying a felsite dike intrusion into limestone,
was reported. Development consisted of a 60-foot
shaft and 100 feet of tunnel work. No shipments of
ore were made previous to 1929. The property was idle
in 1929, and 1945 (Tucker and Sampson, 1945, p. 148),
but was relocated in 1950 by Dan Figueroa, P.O. Box 453,
Blythe. In 1950 and 1951 the mine was active and pro-
duction was recorded.

Geology:

Geology: The mine area is along the contact between an intrusive body of fine-grained granodiorite (?) and northeast-trending, tan-colored dolomitic limestone (fig. 2/). The dolomitic limestone is blocky and jointed, very coarse grained in large part, and dips gently northwestward. Most of the workings are in a pre-mineral fault zone which served as a channel-way for veins containing hematite, chalcocpyrite, galena, sphalerite, epidote, chert, quartz and silver. Subsequent oxidation of vein material has resulted in the formation of azurite, limonite, plumbojarosite and jarosite. Seams of drusy, white gypsum occur locally, coating both vein material and country rock. Locally, veins of quartz and epidote, as much as 5 feet thick, intrude the dolomitic limestone. About half a mile north of the adits a well developed tactite zone occurs. Thin intercalated layers of brown garnet, white quartz, white and blue calcite, black tourmaline and green epidote are present in this zone. A mass of augen gneiss rests upon the dolomitic limestone, and forms the backbone of the ridge above and northwest of the workings.

Development: Of a total of 9 adits, 5 have been driven northwest, 2 north, 1 northeast and 1 south. They are all in dolomitic limestone above the intrusive contact (fig. 1/). About half a mile northeast and about 200 feet higher on the same slope are 3 shafts of varying depth but no more than 50 feet. They are inclined about 45° northwest and in a tactite zone (fig. 3/). Workings, including adits, winzes, raises and stopes aggregate over 1300 feet and are accessible by jeep road, and foot travel on a good trail. The dirt road joins the Midland road about 2½ miles southeast of Midland (fig. 1/). Elevation of the workings is approximately 2000 feet. The mine is idle.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owner.

Year	Crude ore (tons)	G Gold (ounces)	Silver (ounces)	Recoverable Metals Copper (pounds)	Lead (pounds)	Zinc (pounds)
1950	56	1	390	108	15,922	-----
1951*	181	---	1166	---	52,415	1,901

* The 1951 yield comprised both mined ore and dump material.

The mined ore was found near the surface in the form of a kidney^{of} sulfides. The site of this operation is marked by an open gallery near the point where the road turns west at the head of the canyon (fig. /) (personal communication, Danny G. Figuerca).

References: Tucker & Sampson, 1945, p. 148; Tucker, 1929, p. 491.

J.R.E. 12/18/53.

Figure 1. Index and geologic map showing the location and areal distribution of the workings of the Neal Group (topography from U.S.G.S. 15' Midland quadrangle, 1952).

Figure 2/. Looking southwest toward Midland and the Little Maria Mountains. The lower workings of the Neal Group are visible in the right foreground (fig. 1/).

Figure 3. View north toward the upper workings of the Neal Group. Note the gently west dipping beds of dolomitic limestone and the darker colored overlying augen gneiss (fig. 1/).

Black Eagle Mine

Location: Sec. 307, T. 3 S., R. 14 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Eagle Mountains, about 12½ miles northeast of the East Pinto Basin-West Pinto Basin - Cottonwood Pass and Black Eagle mine roads intersection and adjacent to the Black Eagle mine road.

Ownership: Kaiser Steel Corporation, P.O. Box 217, Fontana, owns at least 3 patented claims; Mileta Nos. 1, 2, and 3 (March 1960).

History: The mine was originally located by M. Rust in 1898, and relocated by Edward Harmon in 1921 (Tucker, 1924, unpublished field report No. 84). In 1924 the property comprised 3 unpatented claims (Mileta Nos. 1, 2, and 3) and was still owned by Edward Harmon of San Bernardino, but under option to A. W. Scott and George Hayden of Los Angeles. Water was hauled 20 miles north from Cottonwood Springs in a 45 gallon tank. The mine was active and 6 men were employed (Tucker, 1924, p. 193). Tucker and Sampson (1929, pp. 474-475) report the mine was in operation from 1923 until the latter part of 1933.

By 1929 the mine was owned by the Black Eagle Mines Incorporated, L. M. Clancy, president, 505 Roosevelt Boulevard, Los Angeles, and was reported idle. The mine was apparently operated intermittently from about 1930 until the latter part of 1940. California Division of Mines records show a nearly continuous record of production from 1935 to 1940. In the early part of 1939, a 100-ton concentration and flotation plant was installed on the property. The plant was operated from July 1939 to January 1940, and treated ore at the rate of 75 tons per 24 hours. During this period the value of concentrates shipped was \$53,706 (Tucker and Sampson, 1945, p. 147). Concentrates were shipped to Midvale, Utah, and 20 men were employed (Tucker and Sampson 1940, p. 47). All mine and mill equipment were removed from the property in December 1940. In 1945 the mine was owned by Imperial Metals Incorporated, S. B. Mosher, president, 811 W. 7th Street, Los Angeles (Tucker and Sampson, 1945, p. 146).

Geology: A fault zone separating diorite from quartzite contains a major N. 70° W.-trending and 35° N.-dipping quartz vein (Black Eagle Vein) filled with galena, malachite, azurite, cuprite, anglesite, cerussite, lead vanadate, gold and silver. The vein ranges in thickness from 4 to 10 feet, has an average thickness of 6 feet, and a proven surface length of about 3000 feet. About 1400 feet west of the main shaft another vein (South Vein) striking N. 40° W. and dipping steeply northeast, intersects the Bald Eagle Vein at an oblique angle (see fig. 1/). It is of minor importance and nearly all the work has been confined to the Bald Eagle Vein (Tucker and Sampson, 1945, p. 146).

Development: A two-compartment shaft is sunk in the Black Eagle Vein to a depth of 650 feet. There are levels at 60, 100, 150, 200, 300 and 500 feet. On the 60-foot (adit level) there is a drift 600 feet west and 160 feet east from the shaft. On the 150-foot level there is a drift 500 feet west and 180 feet east from the shaft. There is a 200 foot west drift and 180-foot east drift on the 200-foot level. On the 300 foot level there is ^a 485-foot drift west from whence a crosscut extends south 550 feet to the South Vein. The vein has been drifted 170 feet from the crosscut. At present (1960) the mine is in large part caved, filled and boarded over, and of course inaccessible.

Production: The total production of the mine is estimated by Tucker and Sampson (1945, p. 147) to be \$200,000. They also list the following data for concentrates and ore shipped from the property from 1935 to 1940.

Year	Copper		Lead		Silver
	Pounds	Value	Pounds	Value	Value
1935	2,073	\$172.00	15,303	\$616.00	\$1,953.00
1936	6,355	525.00	53,983	2,483.00	4,269.00
1938	15,044	1,479.00	241,510	11,109.00	3,387.00
1939	68,683	7,143.00	634,071	29,801.00	11,604.00
940	22,269	2,516.00	536,047	26,823.00	22,510.00

References: Tucker, 1924, unpublished Field Report
No. 84; Tucker 1924, pp. 193-196; Tucker and Sampson, 1929,
pp. 474-476; Tucker and Sampson, 1940, p. 47; Tucker and
Sampson, 1945, pp. 146-147; Newman, 1924, unpublished
report on the Black Eagle mine, 6 pp.

J.R.E. 3/17/60

Figure 1/. Plan map and longitudinal sections of the
Black Eagle Vein in 1924 (adapted from an unpublished
report by M. A. Newman.)

Cap Hunter (Poor Boy) Mine

Location: Sec. 33 (?), T. 7 S., R. 16 E., S.B.M., U. S. Army Corps of Engineers, Chuckwalla Mountains quadrangle, 15', 1945; on the south side of a west-trending valley near the south margin of the Chuckwalla Mountains. The mine is at the end of Dupont Road, much of which is shown on the Sidewinder Well quadrangle, 1952; (U. S. Geological Survey, 15'); but is not indicated on the Chuckwalla Mountains quadrangle.

Ownership: Undetermined.

History: The Cap Hunter Mine appears to be an old claim but no records were found dated earlier than 1952. From 1952 to 1954 the mine was held by Roy M. Berg, Box 456 Desert Center. In 1957 it was held by Jack Stewart, William Sandoval and Bert L. George, who called it the Poor Boy.

Geology: The low ridges in the mine area are underlain by gneiss. A fault zone 1 to 2 feet wide is poorly exposed through a horizontal distance of about 400 feet. It strikes N. 75° W., and dips 45° SW. The fault contains a quartz vein, a foot or less in thickness, which carries iron oxides, galena, secondary copper minerals, and small proportions of cerussite. The vein quartz has been fractured, and the resulting spaces filled by the iron and copper minerals.

Development: The workings, now inaccessible, comprise 3 inclined shafts on the fault and an undetermined amount of drifting and stoping. The southeast shaft is about 50 feet deep and collared by collapsing timber. The middle shaft, about 125 feet to the northwest, is caved and flooded to within about 20 feet of the collar. The northwest shaft, about 280 feet farther to the northwest, is 25 feet deep and has no vein exposed in it.

Production: Compiled by the U. S. Bureau of Mines and published with permission of the owners.

Year	Crude ore (tons)	Recoverable Metals			
		Gold (ounces)	Silver (ounces)	Copper (pounds)	Lead (pounds)
1952	1		5		316
1953	3	1	25		1,098
1954	40	1	15	54	850

References: None.

R.B.S. 1/22/60.

Carbonate Lead Mine

See Groover Mine.

Corona Lead-Zinc Mine

Location: SE $\frac{1}{4}$ sec. 14, T. 4 S., R. 7 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 4 miles south
of Corona on a steep ridge along the west side of Manning
Canyon, midway between Eagle and Main Street (Gypsum)
Canyons.

Ownership: Robert a Matthey, Jr., 11359 Biona Drive,
Los Angeles 66, formerly held five lode claims by
location: Wild Oak Nos. 1-5.

History: Located by Joe Smith, Temecula, and Fred
Spiess, Corona, probably in the early 1940's. In 1943-
45 it was under lease and option to Victor Mishelle,
Corona Lead-Zinc Company, Malibu Beach, but was idle in
1945 (Tucker and Sampson, 1945, p. 147). About 1948 the
property was acquired by Mr. Matthey, who did some devel-
opment work for several years. In 1953 the principal adit
was locked, the open cuts slumped, and the entire area
covered with dense brush. The property has remained idle.

Geology: According to Tucker and Sampson (1945, p. 147) the mine explores a vein that contains oxidized lead-zinc and occurs in marine metasedimentary rocks. The mineralized areas occur along fracture zones in a small pod of quartzite, gray hornfels, and metagraywacke of the Triassic(?) Bedford Canyon Formation. The metamorphic rocks are engulfed in hornblende andesite of the Jurassic(?) Santiago Peak Volcanics. Most of the lead-zinc is in a single discontinuous calcite-quartz vein exposed high on the steep west side of Manning Canyon. The vein material is mostly limonite-stained white to brown calcite with minor amounts of vein quartz showing sparse black manganese dendrite. The vein fills a fracture zone which strikes northeast and dips 45° northwest. The vein ranges from 2 to 6 feet in width, but the mineralized zone extends over as much as 15 feet and the metasedimentary country rock carries pyrite and pyrite altered to limonite. When visited in 1953 little vein material was encountered and no ore minerals were observed.

Development: Open cuts and adits. Tucker and Sampson (1945, p. 147) described the development thus: main workings were an open cut driven northeast for 360 feet and which explored the principal fracture zone high on the ridge west of Manning Canyon. Three hundred feet below the open cut and at the floor of Manning Canyon on its west side a crosscut adit, 92 feet long in 1945, was being driven N. 15° W. to intersect the vein exposed by the open cut above. This crosscut apparently did not cut the vein, although the rock in the face carried pyrite. Farther up Manning Canyon, about 300 feet west of the crosscut adit, there is a small open cut and two short adits are driven on a vein parallel to the principal mineralized zone exposed on the ridge above.

Production: A small mill was built in Manning Canyon in the early 1940's and although it is said to have been in operation about 1943 no record of production was found.

References: Tucker and Sampson, 1945, p. 147-148; Goodwin, 1957, p. 601-602; Gray, 1961, p. 61-62, 116. C.H.G. 8/17/62.

Desert Center Mine

Location: SW¹/₄ sec. 18, NW¹/₄ sec. 19, T. 7 S., R. 17 E., (proj.) S.B.M., U.S. Army Corps of Engineers, Chuckwalla Mountains quadrangle, 15', 1945; and Sidewinder Well quadrangle, 1952; on the east slope of the Chuckwalla Mountains about 2 miles south of Ship Creek. In March of 1962 a crude road had been bulldozed northwestward to the property from the Aztec Mines area on Dupont Road (shown on the Sidewinder Well quadrangle).

Ownership: C. H. McDonell and Gilbert Martin, c/o Vaux, 817 Balboa Blvd., Balboa, or Box 523, Desert Center.

History: The Desert Center mine was first described in 1929 (Tucker and Sampson, p. 491), at which time the property was held by S. A. Ragsdale, Desert Center and only assessment work was being done. U. S. Bureau of Mines records show that, in 1940, this property was held by Desert Center Mining Company, Los Angeles. In 1945 the mine was idle (Tucker and Sampson, 1945, p. 148, pl. 35). The present owners have held claims in the area since the mid-1950's.

Geology: The mine area is underlain by gneissic granitic rock cut by northeast and northwest-trending faults which contain metaliferous vein deposits. The best-exposed deposit cuts across a saddle in a narrow ridge west of the wash parallel to which the road to the mine ascends. In the saddle, a fault zone 6 feet wide strikes N. 60° E. and dips 85° SE. Within the fault zone are a basic dike about 2 feet thick and pods and stringers of quartz as much as 10 inches thick. The quartz is fractured and contains local concentrations of iron oxides, cerussite, and partially altered galena. In addition to lead, this deposit is reported (U.S. Bureau of Mines records) to contain small proportions of gold and silver. The deposit is exposed through a horizontal distance of about 100 feet on the northeast slope of the saddle, some 50 feet on the southwest slope, and an additional 150 to 200 feet southwestward across an adjoining spur.

A second fault is poorly exposed along the crest of a low, narrow ridge at the end of the road, parallel to the east bank of the wash and about 1,000 feet north-east of the above deposit. This fault zone appears to be about 18 inches wide. It strikes N. 50° W. and is vertical. Although vein material is not common in the outcrop, the mine dump shows vein quartz fragments as much as 6 inches thick containing bunches of galena, cerussite, iron oxides, and sparse crusts and bunches of secondary copper minerals. The lateral exposed extent of this fault may comprise the full length of the ridge, a distance of 1,000 or more feet, but it appears to be sparsely mineralized. At the southeast end of this ridge a 4-foot-wide fault zone strikes N. 85° E. and is vertical where exposed at the collar of a shaft. Here a 4-inch quartz vein contains small crystals of pyrite.

Development: The southwest saddle is explored by a 12-foot drift adit and six prospect pits on its northeast slope and a 25-foot shaft and several prospect pits on the southwest slope. The northeast ridge is explored by two shafts, both sealed against entry. One of these shafts appears to explore the junction of the N. 85° E. fault and the ridge fault. The other is about 400 feet to the northwest and appears to explore an ore shoot. The present owner is building a cable conveyor system from the southwest-saddle development to a site near the end of the road at the toe of the northeast ridge.

Production: U. S. Bureau of Mines records show that in 1940, 4 tons of ore yielded 2 ounces of gold and 3 ounces of silver. Though not reported for that shipment, lead is the most abundant metal in this deposit.

References: Tucker and Sampson: 1929, p. 491; 1945, p. 148, pl. 35.
R.B.S. 3/15/62.

Groover (Carbonate Lead) *mine*

Location: Sec. 4, T. 2 S., R. 11 E., S.B.M. (proj.),

Valley Mountain quadrangle, 1956; Pinto Mountains, 6 miles south-southwest of Old Dale.

Ownership: F. E. Groover, 12691 Trask Ave., Garden Grove, owns 1 unpatented claim (March 1958).

History: Undetermined.

Geology: An intrusion of porphyritic quartz monzonite into white, tan weathering medium-grained dolomitic limestone, has produced a tactite zone as much as 7 feet thick. The intrusion has been along a fault in the area adjacent to the main shaft (Fig. 1/, B). The tactite zone contains galena, azurite, malachite, and minor amounts of gold and silver. A body of massive epidote and gray chert occurs adjacent to the main adit (fig. 1, B). Several thin diorite dikes cut the quartz monzonite, and one near the portal of the main adit is about 7 feet thick and bounded by faults. The dolomitic limestone is a part of a sequence of northerly-dipping metasedimentary rocks composed principally of varicolored quartzites (fig. 1/, A). Major normal faults, trending northwest and dipping southwest, cut both the quartz monzonite and the metasedimentary rocks.

Development: The 2-compartment main shaft is sunk 150 feet north at 45° in a northeast-trending fault plane. The fault is exposed southwest and northeast a total of 215 feet from the shaft along the strike by surface trenching and open cuts. At the bottom of the shaft a drift extends west about 30 feet (fig. 1/, B). The main adit, 300 feet east of main shaft, is driven south about 90 feet. At 50 feet a crosscut extends 95 feet southeast. At the end of the crosscut a raise connects to the ground surface 20 feet above (fig. 1/, B). The mine is idle.

Production: Undetermined.

~~Selected~~ References: None.

J.R.E. 3/29/60

Figure 1/. A. Geologic map of the Groover mine and adjacent area (topography from U.S.G.S. 15' Valley Mountain quadrangle, 1956). B. Geologic sketch maps of the main shaft and main adit of the Groover mine.

Jacklin Mine

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 24, T. 1 S., R. 22 E., S.B.M., Vidal quadrangle, 1950; on the northeast slope of the West Riverside Mountains, 7 $\frac{1}{2}$ miles southwest of Vidal.

Ownership: Undetermined().

History: Undetermined.

Geology: The country rock is slightly gneissic granodiorite. Irregular, tabular, and lenticular quartz bodies, generally less than one foot in thickness and a few tens of feet in strike length, are exposed in the mine area.

Development: A 75-foot drift has been driven southwest along a vertical quartz vein which strikes N. 55° E. The vein is tracable for about 60 feet on the surface and is from 4 to 6 inches wide in the adit. The quartz contains small proportions of galena, chrysocolla, and iron oxides. The adit is open and dry but no equipment remains at the site. When the property was visited, the road, shown on the map, was still in good condition (Dec. 1957). CK 11-78

Production: Undetermined. ~~1957~~

References: None.

R.B.S. and C.H.G. 12/17/57.

Neal Group

See Bald Eagle Mine.

Ragsdale Claim

Location: NE $\frac{1}{4}$ sec. 19 (proj.), T. 7 S., R. 17 E., S.B.M., Sidewinder Well quadrangle, 1952; on the east slope of the Chuckwalla Mountains. The property is a quarter of a mile north of the Aztec and Rainbow claims and accessible by a short side road from Dupont Road.

Ownership: Undetermined.

History: Undetermined.

Geology: The country rock is gneiss cut by dioritic porphyry dikes. A shear zone, which strikes S. 65° W. and dips 75° NW., is poorly exposed for about 100 feet on the east slope of a low ridge. The zone contains a quartz vein ranging from 0 to 6 inches in thickness. Pyrite and galena appear once to have been abundant in the vein but are now largely altered, the pyrite to iron oxides and traces of secondary copper minerals, and the galena to cerussite and wulfenite. Fractures in the vein are partially filled with crystalline quartz and chalcedony.

Development: The deposit has been developed by means of a single 35-foot drift adit and two prospect pits.

Production: Undetermined. Idle (1960).

References: None.

R.B.S. 2/24/60.

X

Lamb Canyon (Snyder) Deposit

Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, sec. 32, T. 3 S., R. 1 W., S.B.M., Lakeview quadrangle, 7 $\frac{1}{2}$ ', 1953; about 5 miles southwest of Beaumont in the northwestern San Jacinto Mountains on the east side of Lamb Canyon, near the crest of a prominent west-trending ridge.

Ownership: Undetermined.

History: The Lamb Canyon deposit probably was the source of limestone for Snyder's Kilns which in 1906 (Aubury, p.76) were reported to be 7 miles north of San Jacinto and operated by Ferdinand Snyder. The deposit was opened about 1896 and probably closed down shortly after 1906 and apparently has since remained idle. Two large steel-shell lime kilns are still standing on the south side of lower Lamb Canyon, about three quarters of a mile southwest of the quarries. The kilns were fired by wood, and the product was reported to be an excellent lime for sugar refineries.

X

Geology: Pre-Cretaceous limestone occurs in discontinuous lenses interbedded with mica schist and intruded by granitic rocks. This deposit, as well as a number of other limestone lenses, is part of a large mass of metamorphic rock that extends about 8 miles southeast from north of Lamb Canyon to Soboba Hot Springs. Several small layers of blue-gray to gray and white, fine to medium grained, crystalline limestone are exposed in two quarries and adjacent road cuts. The beds strike N. 55° W., and dip 55° NE. Although the rock appears to be high-calcium limestone all of the bodies observed are too small for economic operation. *but actually a few thin layers of limestone could be mined if by selective mining* The sequence exposed in the road slot along the east side of the west or lower quarry from south to north is as follows: granite and schist; blue-gray limestone with minor schist and granite interleaves, 90 feet; gneissic granite, 30 feet; gray to white limestone, 30 feet (the layer that was mined); schist and granite containing about 6 thin limestone layers ranging from one foot to 4 feet in thickness, 200 feet. The limestone layers are exposed for a strike

X

length of about 250 feet in the quarry and road cut. About 500 feet to the northeast a second sequence of schist and limestone, parallel to the first sequence, is exposed in a shallow road cut. Here three beds of gray to white, fine to medium grained, crystalline limestone are exposed over a distance of about 150 feet. The limestone beds are 3 to 4 feet thick and are interleaved with schist and intruded by granite. The beds can be traced along their strike up the ridge to a second quarry (east or upper quarry) about 500 feet ^{east} southwest of the road cut.

Development: The west quarry, adjacent to the road, is a side-hill cut about 50 feet long, 50 feet wide, with face 25 feet high. The east quarry, above the road, is a side-hill cut about 50 feet long and 15 feet deep.

Production: Undetermined, probably no more than a few thousands of tons.

References: Aubury, 1906, p. 76; Logan, 1947, p. 271;
C.H.G. 7/2/63. *Saul, Evans, and Hay, 195 —, p. —.*

Maria Mountains Mar

(~~Marl and Travertine Deposits North of Blythe~~)

Marl and travertine have formed local caps, flanking sheets and buttressed benches (fig. ~~1~~) on spurs and foothills along the south and east flanks of the Big Maria Mountains, and the south, east, and north flanks of the Riverside Mountains; two arid ranges lying north of Blythe. These deposits are the remnants of a shore line of Pliocene(?) age, possibly that of a former, more northern lobe of the Gulf of California (Hamilton, 1961, p. 276-277). The marl appears once to have been beach or near shore sand composed almost entirely of marine shells, shell fragments, and the tests of microorganisms. The travertine was probably the result of the precipitation of calcium carbonate from saturated, saline water. Many of these deposits grade downward into subjacent alluvium and talus and at some localities the interface between cemented debris and underlying loose regolith has been the site of deposition of manganese oxides.

To date (1958) these unusual deposits of calcium carbonate have been exploited in only a small way as a source of dimension stone (fig. ~~1~~) and manganese ore. A local demand for agricultural marl is unlikely because of the natural alkalinity of soils in the Palo Verde Irrigation District.

References: Hamilton, 1960, p. 276-277; Thomas 1961, p. 69;
R.B.S. 4/10/58 *Saul, Evans, et al., May, 1961, p. —*

X

Moore Limestone Deposit (Bautista Canyon Deposits)

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 34, T. 5 S., R. 1 E., S.B.M., Hemet quadrangle, 1957; about 7 $\frac{1}{2}$ miles southeast of Hemet on the west side of Bautista Creek, about 1,500 feet west and 300 feet above the Bautista Creek road.

Ownership: Undetermined.

History: Deposit was quarried on a small scale in the middle 1920's by J. S. Moore, Winchester. Probably the rock was crushed and marketed as poultry grit. By 1929 the property was idle and apparently has since remained idle.

Geology: Pre-Cretaceous limestone occurs in discontinuous lenses and bunches interbedded with mica and hornblende schist and intruded by granitic rocks. The metamorphic sequence strikes northwest (roughly parallel to the trend of Bautista Canyon) and dips 65°-75° NE. Two lenses of fetid, coarsely crystalline, white to light gray limestone with some associated tactite, hornblende schist, and hornfels crop out across a southwest-trending gulch. The lower lens is 20-30 feet thick and extends both north and south of the gulch. The upper lens is separated from the lower lens by 50-100 feet of schist and granitic rock. This upper lens is best exposed along a fire break at the ridge top where the lens may have a maximum thickness of 100-125 feet. It does not appear to have much strike length and seems to pinch out rapidly to the south. Ground water has discolored the limestone to red an unknown depth from the surface and the rock is extensively fractured. Some of the limestone is graphitic and some is sky-blue

similar to Crestmore rock. Reserves cannot be estimated without further development work and intrusions of granite may be encountered. Two random type samples collected by the Division of Mines in 1953 and chemically analyzed by Abbot A. Hank^S, Inc., San Francisco showed the material to be dolomitic as follows:

Sample No.	Insoluble	Fe ₂ O ₃ and Al ₂ O ₃	CaO	MgO	P ₂ O ₅
C.-N1	11.46%	0.60%	38.92%	8.65%	0.12%
C.-N2	0.86	0.38	50.00	4.89	0.17

Development: Side-hill cut 50 feet long with face 20 feet high. Rock was lowered from the quarry to truck at road level by means of a gravity incline tram car. Apparently this was a small scale hand-methods quarrying operation.

Production: Undetermined, probably no more than a few hundred tons.

References: Tucker and Sampson, 1929, p. 516; Tucker and Sampson, 1932, p. 7, pl. 1; Tucker and Sampson, 1945, p. 172; Logan, 1947, p. 272; Saul, Evans, and Heagy, 196 —, p. — — — — —
C.H.G. 7/2/63.

Nightingale Limestone (see also Harris, Pigeon Fl.

Location: Secs. 6, 8, 9, 10, 11, 12, T. 7 S.,
R. 5 E., S.B.M., Idyllwild quadrangle, 1959, and Palm
Desert quadrangle, 1959; on the north and northeast
flanks of the Santa Rosa Mountains astride State High-
way 74 at Nightingale.

Ownership: Palm Canyon Rock Products, Inc., 865
North Palm Canyon Drive, Palm Springs, holds an unde-
termined number of claims (known as the Beckelman-
Lucas limestone deposit) in section 6 at the head of
Palm Canyon. Henry B. Tuttle and Associates, 218 S.
Palm Canyon Drive, Palm Springs, hold claims in the N $\frac{1}{2}$
sec. 8, under the name White Ridge Dolomite Claims.
Section 9 is owned in part by Palm Springs Alpine
Estates. In section 11, at the head of Deep Canyon,
50 acres of rugged terrain are owned by the H. T. Lucas
Mining Company, 1534 North Hobart Blvd., Los Angeles 27.

History: Limestone in the Nightingale area has been known for many years (Merrill, 1917 ^{P. 55/} ~~1919~~, fig. 4). Parts of these deposits have been known as Pinyon Flat, Harris, and Big Hill Deposits (Tucker and Sampson, 1945, pl. 35, no. 233, no. 236; Logan, 1947, p. 271-272). In 1946 Wright (pl. 1) mapped the limestone exposed in T. 7 S., R. 5 E. The Lucas Mining Company developed their property in Deep Canyon since World War II and it was probably most active during the 1950's. A crushing and grinding plant was built at the quarry site but was abandoned in 1957 in favor of their present plant near Thousand Palms. In 1958 this operation was leased by Imperial Limestone Products, Inc., who operated the property until 1960 when the operation was again assumed by the H. T. Lucas Mining Company. This property has apparently been intermittently active since 1960.

Roofing granules and decorative stone have been the chief products to date.

X

Geology: The Nightingale limestone deposit is part of a narrow belt of carbonate rock which is irregularly exposed for a distance of about 6 miles from the head of Palm Canyon southeastward across the head of Deep Canyon and thence into Horsethief Creek. The limestone is part of a metamorphic sequence composed mostly of schist and gneiss which continues southeastward across the divide between Toro Peak and Martinez Mountain, and down the southwest side of Black Rabbit and Martinez canyons and on into San Diego County. In the Nightingale area Wright (1946, p. 11) estimated the thickness of the limestone unit to be as great as 200 feet. In the east part of section 6 the maximum width of outcrop is about 1,300 feet. The strike of the metamorphic rocks ranges from north, in Palm Canyon, to easterly in the Nightingale area. Dips range from about 30° east to 40° north. This and other similar limestone units are part of an extensive irregular mass of metasedimentary rocks named the Palm Canyon Complex by Miller (1944). Miller considered these rocks to be Paleozoic in age and they are intruded by Mesozoic granitic rocks of the southern California Batholith. Locally, especially in the Martinez Canyon area, the limestone is altered to impure marble and tactite. In the Nightingale area the limestone is white, medium to coarse grained, and, though strongly sheared, large masses contain no visible impurities.

The following data, submitted by Mr. Harry Beckelman, Palm Canyon Rock Products, Inc., is an analysis of one sample by The Eisenhower Laboratories, Los Angeles, February, 1959: CaCO_3 , 99.94%; CaO , 55.57%; MgO , 0.21%; Mg , 0.10%; Fe_2O_3 , 0.04%; Al_2O_3 , 0.06%; SiO_2 , 0.43%; acid insolubles, 0.43%; H_2O , 0.27%; loss on ignition, 43.78%; specific gravity, 2.7; hardness 3.2.

Development: To date (1936) the principal site of mining has been a series of open cuts and benches, with faces as much as 75 feet high, extending through a horizontal distance of about half a mile in sections 11 and 12 on the Lucas property. In June, 1958, blasted rock was being handled with a front-loading dozer, a shaker screen, and belt loader, the raw product being trucked to the H. T. Lucas Co. roofing granule plant near Thousand Palms (Photo).

Production: A large tonnage of material appears to have been removed from the Lucas property but no accurate total was obtained. Late in 1962 the Thousand Palms granule plant was using about 200 tons of white limestone a month; a demand which required only sporadic quarrying.

References: Merrill, 1917 [1919], p. 91; Miller, 1944, p. 21-25; Tucker and Sampson, 1945, pl. 35, no. 233, no. 236; Wright, 1946, p. 11, pl. 1; Logan 1947, p. 271-272, pl. 37, no. 12; Sant, Evans, and Gray, 196 — p. —
C.H.G. 8/20/63.

Nonhof Deposit

Location: Sec. 16(?) T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, about 3 miles southwest of Corona in the vicinity of Hagador Canyon. Location not verified.

Ownership: E. R. E. Nonhof, 1116 Ramona Avenue, Corona (1924). Undetermined (1961).

History: Mr. Nonhof located one claim in 1915 on which he reported a bold outcrop of "lime", 1,500 feet long, about 70 feet wide, and 50 feet thick; developed by a short adit. The writer was unable to locate such an outcrop in 1953. Ruins of a small lime kiln are said to have been found in upper Hagador Canyon in 1907, but were not identifiable in 1953.

Geology: Several small exposures of pyrite and limonite-bearing medium-grained crystalline limestone crop out, and limy metashales occur in the Triassic (?) Bedford Canyon Formation in the area. Perhaps these materials were the source of "limestone" for the small kiln.

Development: Several short adits, and a number of prospect pits have been opened in the area.

Production: Undetermined.

References: Gray, 1961, p. 116-117: *Saul, Evans, and Gray, 1961*

C.H.G. 3/3/61

Magstone Products

See: Castro Quarry.

Snyder Deposit

See: Lamb Canyon deposit herein.

Bautista Canyon Deposits

See: Moore limestone deposit and San Jacinto Rock
Products Company's limestone deposit herein.

Harris Limestone Deposit

See Nightingale limestone.

~~Unknown Prospect~~ (name undetermined).

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 32, T. 4 S., R. 6 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern slope
of the Santa Ana Mountains, 7 $\frac{3}{4}$ miles southeast of
Corona, just east of Bedford Motorway.

Ownership: Undetermined.

History: Undetermined.

Geology: Discontinuous lens, 20 to 30 feet wide, and
about 1,000 feet long, of dark gray fine-grained lime-
stone. Weathers light gray. Apparently in part
brecciated. Strikes N. 65° E., dips 75° NW. Occurs
within graywacke and slate of the Triassic(?) Bedford
Canyon Formation. Reserves are apparently small.
Analysis by Abbot A. Hanks, Inc., June 1956 of one
random type sample collected by the writer was as follows:

<u>SiO₂</u>	<u>Fe₂O₃</u>	<u>Al₂O₃</u>	<u>CaO</u>	<u>MgO</u>	<u>P₂O₅</u>
9.18%	0.80%	9.18%	43.74%	0.83%	0.03%

Development: Undeveloped prospect.

Production: None.

References: Gray, 1961, p. 117; *Sand, Evans; and Gray, 196 — 3 p.*

C.H.G. 3/3/61.

Mira Loma

See: Glen Avon Limestone Deposit.

Old City Quarry (Fairmount Hill Quarry, North Hill Quarry)

See under Rock Products, Broken and Crushed Stone.

North Hill Quarry (Fairmount Hill Quarry, Old City Quarry)

See: Old City Quarry under Rock Products, Broken and
Crushed Stone.

X

New City Quarry

Location: S $\frac{1}{2}$ sec. 36, T. 2 S., R. 5 W., S.B.M., Riverside East quadrangle, 7 $\frac{1}{2}$ ', 1953; northeast-trending, isolated hill on the north side of Central Avenue, three quarters of a mile east of Victoria Avenue in the City of Riverside.

Ownership: Undetermined (1963).

History: During the period from about 1930 to 1942 the City of Riverside quarried limestone for use in oil and macadam construction of city streets. Many of these streets are still in use in 1963, and apparently will continue to be serviceable for many years. The quarry was shut down because of World War II and apparently has not been reopened, but small amounts of remaining loose material may have been used intermittently. During the 1950's extensive residential construction began in the area and by 1963 the deposit was surrounded by homes and the floor of the old main quarry was occupied by a swim club. Future quarrying appears unlikely.

A

Geology: The quarry and adjacent hill are underlain by a sequence of pre-Cretaceous metamorphic rocks intruded by hornblende-biotite-quartz diorite. Larsen (1951, plate 1) mapped the metamorphic rocks as Paleozoic and assigned the intrusive rocks to the Cretaceous Bonsall Tonalite. The metamorphic sequence strikes about N. 40° E., dips 45° to 70° SE. and has a surface exposure^{uv} of about 1,500 feet along the strike and a width of about 300 feet. The maximum true thickness of the metamorphic rocks is 200 feet at the south end of the deposit and thins to about 130 feet at the north end. The sequence exposed at the south end of the deposit, from west to east is: quartz diorite; limestone and predazzite, 40 feet; quartz diorite, 15 feet; pyroxene hornfels, 25 feet; quartz diorite, 10 feet, skarn, 5 feet; limestone and predazzite, 105 feet; quartz diorite. The limestone is medium to very coarse crystalline, white, gray, and light blue-gray. The maximum thickness of the west layer of limestone is about 40 feet and the east layer is about 120 feet in maximum thickness. At the north end of the deposit the west layer of limestone thins to less than 10 feet thick and the east layer thins to about 25 feet. Along the west edge of the east limestone layer is a thin garnet-pyroxene skarn zone, in most places about 2 feet thick. A number of minerals have been found in the quarry area and some have been reported by Murdoch and Webb (1956).

Development: Most of the quarrying was in the east limestone layer from one irregular side-hill quarry about 1,000 feet long opened on the south end of the deposit and extending along the strike of the limestone. This quarry was about 200 feet wide and had several irregular bench levels. At the north end of the deposit both the east and west limestone layers have been quarried from a side-hill cut about 200 feet long across the strike of the limestone layers and 150 feet wide. During the period of greatest activity in the middle 1930's crushing, sizing, and storage facilities were located at the quarry.

Production: Total undetermined, probably a few tens of thousands of tons each year during the 1930's. Apparently all of the limestone was used as broken and crushed stone in street construction.

References: Larsen, 1951, plate 1; *Sant, Evans, and May, 196—, p. —*.
C.H.G. 7/30/63.

X

Riverside Cement Company, Division of American Cement
Corporation (Crestmore) Deposit and Plant

Location: W $\frac{1}{2}$ sec. 2 (proj.), E $\frac{1}{2}$ sec. 3, T. 2 S., R. 5 W.,
S.B.M., San Bernardino quadrangle, 1954; about 3 miles
northwest of Riverside at Crestmore Siding at the eastern
margin of the Crestmore Hills.

Ownership: Riverside Cement Company, Division of
American Cement Corporation, Mill office, P.O. Box 832,
Riverside.

History: The Crestmore deposit has been mined for
more than 60 years. Apparently the deposit was first
developed in the late 1890's by the American Beet-Sugar
Company and in the early 1900's was operated by the Sky
Blue Marble and Onyx Company for building stone and lime
(Aubury, 1906, p. 75). In October 1909 the Riverside
Portland Cement Company completed a dry-process plant
which has since been in continuous operation. The first
quarry was opened on Chino Hill and quarrying operations
later were extended to the north side of Sky Blue Hill,
the northeastern of the twin hills, and the North Star,
Lone Star, and Wet Weather quarries were successively
opened. Rip rap was taken from the Commercial quarry on
the east side of Sky Blue Hill beginning about 1912, but
later limestone from this quarry was used for the manu-
facture of cement. The Crestmore mine, in which a modi-

fied block-caving system of mining eventually was employed, was opened in 1927 to extract the Chino limestone beneath the floor of the Chino quarry. The mine was worked through a 5-compartment vertical shaft 350 feet deep and is one of the few operations known to have used block-caving techniques in the mining of limestone. Block caving at Crestmore has been described in detail by Robotham, 1934; Bucky, 1945; Wightman, 1945; and Long and Obert, 1958. In 1941 surface quarries, including the Little Hill or Henshaw quarry in San Bernardino County $1\frac{1}{2}$ miles northwest of the plant, were reactivated to supplement the underground production and in 1948 Jensen quarry (described herein), $2\frac{1}{2}$ miles west of the plant, became the major source of limestone. In February 1954 the Crestmore mine was shut down and Jensen quarry supplied all the limestone until March 1955 when work started on a new underground mine at Crestmore to continue extraction of the Chino limestone. This mine, utilizing a room and pillar system, went on full production in June 1956 and has since supplied all limestone requirements.

X

The Crestmore plant had a rated annual capacity of 2,000,000 barrels in 1914 and by 1945 was well over 3,000,000 barrels from 13 kilns. Early in 1958 Riverside Cement Company merged with the Hercules Cement Corporation of Pennsylvania and the Peerless Cement Corporation of Michigan and became the Riverside Division of the American Cement Corporation. Plans were announced for extensive modernization and expansion at Crestmore and in 1958 a new administration and laboratory building was completed.

During 1960-61 new secondary crushing facilities, new packaging and storage facilities, and a new white cement plant were completed. The new white cement plant, built adjacent to the existing gray cement plant, was the first new white cement plant built in the United States in many years, and is one of the few in the world and the only United States plant to use the dry process. The white plant went on stream in mid-1961 with a capacity of about 250,000 barrels from one rotary kiln (9 by 253 feet).

Late in 1961 work began on an extensive modernization program for the gray plant including silos and a complete new raw end with blending piles. This construction was completed in 1962 ^{and two new finish mills were installed in 1963. Early in 1964} and later phases of the modernization program, which will include ~~first the replacement of the finish end and finally enlargement of raw materials handling capacity and installment of new rotary kilns,~~ were under way. In January 1964 the company announced plans to double the capacity of the white plant in a \$3 million investment project scheduled for completion by mid-1965.

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Geology: At Crestmore limestone and siliceous meta-sedimentary rocks occur as a large screen in Cretaceous quartz diorite (Bonsall Tonalite). The metamorphic rocks have been called the Jurupa Series and are regarded as probably of late Paleozoic or early Mesozoic age. The limestone deposit consists of two roughly lenticular bodies which crop out and are separated by about 500 feet of quartz diorite. The limestone bodies strike north and dip about 45° east. At depth and to the east the dips flatten to about 25-30°, the two bodies thicken, and they are separated by only 100 feet of quartz diorite. This quartz diorite layer is a very important feature as it permits the underground extraction of the lower limestone body without disruption of the upper body which is overlain by water-saturated alluvium. In the outcrop

X

area the limestone bodies range from 200 to 300 feet in thickness, but to the east the upper body (Sky Blue Limestone) is about 500 feet thick and the lower body (Chino Limestone, also called the Stanley Bed) is nearly 400 feet thick. The bodies extend about 2,500 feet along strike and are cut off at each end by quartz diorite. The limestone in both bodies is white, fine-to coarse-grained crystalline rock and contains varying amounts of brucite; the lower body contains extremely white rock and mill

A typical analysis of the limestone is: CaO, 55.85%; MgO, 0.3%; SiO₂, nil; Al₂O₃, nil; Fe₂O₃, trace; H₂O, trace; Ig. loss, 43.80%.

feed averages about 95 percent CaCO₃. In addition to being an important source of limestone, Crestmore is a

world-famous mineral locality with nearly 150 recognized species. The minerals and geology at Crestmore have been described by many workers including Eakle, 1917; Woodford, 1943; Burnham, 1959; and Murdoch, 1961.

X

Development: Since June 1956 all mining has been by means of an open-stope, room-and-pillar mine. Completed unsupported rooms are about 60 feet wide and 70 feet high and 200 feet or more long, extending across the width of the deposit. The rooms are mined in two steps with an initial 30-foot cut and then a 40-foot slice is taken from the floor. Drilling is by an Ingersoll-Rand jumbo mounting four 505 wet drifters and by Gardner-Denver Air Trac drills. A Pitman Giraffe, mounted on a diesel truck, is used for loading holes and scaling in the rooms. Roof bolts are used where necessary. After blasting, loading in the rooms is done with Marion 93-M electric shovels equipped with short boom and sticks and a three-yard bucket. Kenworth 302-E electric trucks transport a 30-ton load from the face to the surface up a spiral adit and ramp with 10 percent grade. In 1963 the average length of truck haul is $1\frac{1}{2}$ miles and mining is on the 220-foot level, 680 feet below the surface. Eventually limestone will reach the surface by means of an underground belt conveyor, construction of which started during 1963.

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The electric trucks dump directly into the 60 by 84-inch primary jaw crusher. Secondary reduction to minus 3/8-inch mill feed is done in a Bulldog center-feed impact mill. These facilities supply both the white and gray plants. Secondary crushing output for gray plant feed is conveyed to a ground storage area where raw materials are automatically stored, blended, and reclaimed. This operation, installed in 1962, utilizes wing-type traveling tripper stackers, continuous samplers, and bucket-equipped digging wheels for reclaiming. From the storage area blended material goes by belt conveyor to the mill-feed bins in the raw grinding department. These operations are handled from a newly installed remote control room. Blended material is fed to 13 rotary kilns (8 feet 10 inches by 125 feet). This dry-process plant has a capacity of about 3,250,000

barrels. Two 530-foot long kilns will be installed to replace the 13 kilns now in use and when the rebuild is completed in the fall of 1964, the plant will have a capacity of about 4,500,000 barrels. Complete automation of the kilns will be by a *TRW-330* system.

In addition to limestone, raw materials used include: alluvium, from shallow pits just east of the

plant; gypsum; iron ore; quartzite; and red clay from

a company mine⁵ in Temescal Canyon (Corona clay pit) *and near San Juan Capistrano*

described herein. Special materials used in the white plant

include selectively mined white limestone; white silica

sand from a company pit in the Corona sand district (Smith

silica pit) *described herein* and a low iron clay.

Rego Modulus Inc. TRW-330 continuous control system. In addition to the TRW-330 system will be operating data recording system for output of kiln performance in the field, and in fact raw mill capacity (Plant Products Oct. 1962, p. 124, Dec. 1964, p. 112)

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The Crestmore plant manufactures portland cement Types I and II, block cement, plastic cement, gun plastic cement, and white cement. These products are marketed in bulk and in bags under the brand names "Riverside" and "Riverside White".

Production: From 1930 to 1954, 7,882,000 tons of limestone and granitic materials were extracted from the Crestmore mine by block-caving methods. Since 1956 production has been about 80,000 tons per month. Total production not determined.

References: Aubury, 1906, p. 75-76; Merrill, 1917 [1919], p. 555-559; Eakle, 1917, p. 327-360; Tucker, 1921, p. 324-325; Tucker and Sampson, 1929, p. 517-519; Robotham, 1934, 20 p.; Woodford and others, 1941, p. 351-381; Woodford, 1943, p. 333-365; Bucky, 1945, p. 114-124; Tucker and Sampson, 1945, p. 173-174; Wightman, 1945, p. 215-224; Logan, 1947, p. 272-273; Burnham, 1954, p. 54-57; Burnham, 1954, p. 61-70; Persons, 1955, p. 76-78; Wightman, 1956, p. 33-36, p. 78; Wightman and others, 1957, p. 450-454; Long and Obert, 1958, 21 p.; Burnham, 1959, p. 879-919; Murdoch, 1961, p. 245-257; Utley, 1961, p. 127-130; Bowen and Gray, 1962 p. 7, 10, 11; *Saul, Evans, and Day, 196 —, p. —.*
C.H.G. 11/9/64
2/21/63.

X

San Jacinto Rock Products Company's Limestone
Deposit (Bautista Canyon Deposits)

Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 35, T. 5 S., R. 1 E., S.B.M.,
Hemet quadrangle, 1957; about 8 miles southeast of Hemet
on the west side of Bautista Creek on a steep hillside,
150 - 200 feet above the creek level.

Ownership: San Jacinto Rock Products Company, G. W.
Green, president, San Jacinto held one 20-acre claim in
1945. Undetermined (1963).

History: Quarry opened in 1926 as a source of poultry
grit and was intermittently active as late as 1929. By
1932 the property was idle and apparently has since
remained idle.

Geology: Pre-Cretaceous limestone occurs in discontinuous lenses and bunches interbedded with mica and hornblende schist and intruded by granitic rocks, apparently part of the same sequence as exposed at the Moore deposit, one mile to the northwest. The limestone strikes northwest and appears to dip about 45° SW. where exposed in two cuts, but the extent of the beds cannot be determined because of soil and talus cover. The upper cut is near a hornfels and granite contact, the upper limit of the limestone. Exposed in the cuts is massive, ^{white to light gray,} very coarsely crystalline limestone, some of which is graphitic. Ground water has discolored the limestone to red for an unknown depth from the surface and the rock is extensively fractured. The limestone appears to be of good quality but reserves cannot be estimated from present exposures and intrusions of granite may be expected. Three random type samples collected by the Division of Mines in 1953 and chemically analyzed by Abbot A. Hanks, Inc., San Francisco, were as follows:

Sample no.	Insoluble	Fe ₂ O ₃ and Al ₂ O ₃	CaO	MgO	P ₂ O ₅
--S1	1.56%	0.26%	53.17%	1.30%	0.01%
--S2	0.92	0.26	54.24	0.94	0.01
--S3	0.86	0.22	54.85	0.46	0.01

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Development: Two side-hill cuts. Lower cut is about 150 feet above creek level and is 100 feet long, 15-20 feet wide, with face 30 feet high. The second cut is about 80 feet above and is about 50 feet long, 10 feet high, and 15 feet wide. Blasted rock was allowed to roll downhill to the road where it was loaded onto a truck and hauled to San Jacinto for grinding in the company's plant.

Production: 500 tons by 1929, apparently little, if any, later production.

References: Tucker and Sampson, 1929, p. 519-520; Tucker and Sampson, 1932, p. 8, pl. 1; Tucker and Sampson, 1945, p. 172; Logan, 1947, p. 273; *Saul, Evans, and Henry*, C.H.G.7/2/63. 196 —, p. —.

X

Sims Limestone Deposit

Location: W $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 7, T. 4 S., R. 1 E., S.B.M.,
and E $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 12, T. 4 S., R. 1 W., S.B.M., San Jacinto
quadrangle, 7 $\frac{1}{2}$ ', 1953; Northern San Jacinto Mountains
about 7 miles southeast of Beaumont, 1 mile south of
the end of Highland Springs Avenue in the foothills
above the south end of San Jacinto Nuevo y Potrero.

Ownership: Harold V. Sims, P.O. Box 16, San Jacinto
holds an undetermined acreage of unpatented mining claims
(1958).

History: Property located by Mr. Sims many years ago.
Considerable exploration work has been done, but the
property has not been put into production. In the early
1950's Kaiser Steel Corporation made an extensive exam-
ination of the property and field examinations have been
made by at least one cement company. Access to the
property is difficult because of the pattern of adjacent
private land ownerships and the deposit was idle in
July, 1963.

Geology: Pre-Cretaceous limestone and schist interfingered by granite occurs in two irregularly shaped bodies. The metamorphic sequence strikes northeast and dips steeply northwest. The larger metamorphic rock mass is about 1,500 feet long and 1,250 feet wide; the smaller mass, 500 feet to the west across a deep canyon, is about 750 feet long and 500 feet wide. Both of these bodies are largely limestone and dolomite, but also contain interfingered schist and granite. The limestone is gray to white, fine to very coarse crystalline, and contains some thin, irregular, seams of gray dolomite, as well as several large, spotty and irregular pods of dolomite. In places the limestone is banded and in other places contains a few small graphite crystals and graphitic streaks. Three main bodies of high calcium, coarse, white crystalline limestone are exposed. Perhaps each of these high grade bodies contains as much as 200,000 tons of readily available limestone. The deposit also contains several small masses of reddish-pink, medium grained dolomite which might find favor as a decorative or building stone.

In March, 1957, the Division of Mines collected seven samples from the east body and these samples were chemically analyzed by Abbot A. Hanks, Inc., San Francisco, as follows:

No., location, and description	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	CaO	MgO	P ₂ O ₅
N. end of the S. ridge where best ls. is exposed; glassy, blue-grayish-white, coarsely xline ls.; very uniform, av. grain size about 0.6 cm.	0.67%	0.03%	0.17%	55.18%	0.28%	0.01%
N. end same ridge as spl. 1. Mass of medium to fine-grained, blue-gray, uniform rock about 20 ft. long and 2 ft. thick.	4.28	0.19	1.09	52.20	0.47	0.01
Near N. end of S. ridge; thin, irregular dol. seams cutting coarser-grained ls.; light blue-gray, fine xline rock with coarse calcite bands.	0.58	0.27	0.18	36.73	15.91	0.01
Near S. end of best ls. mass; coarse-grained (1 cm.) glassy white ls., with sparse segregations of fine graphite.	0.24	0.06	0.07	55.53	0.22	0.02
W. side of S. ridge in fire break; reddish-pink, medium grained dol. in a single mass about 4 ft. wide.	0.60	0.36	0.15	34.47	17.76	0.14
"Gully" section along trail, type rock; coarsely xline, glassy white rock with black graphite xls. and a few graphitic streaks.	0.16	0.03	0.05	55.72	0.13	0.01
North sub.lens, on trail near N. end of deposit; coarsely xline bluish-gray and glassy white variegated ls. containing some small graphite xls.	0.24	0.05	0.06	55.14	0.54	0.01

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Development: The limestone bodies have been explored by trails, and extensive bulldozer cuts and jeep roads, and perhaps by drilling.

Production: None.

References: Fraser, 1931, map facing p. 540; *Smith, Evans, and*
Tracy, 1961, p. —.
C.H.G. 7/2/63.

Snow Rock

Location: SW $\frac{1}{4}$ sec. 5, T. 2 S., R. 5 W., S.B.M., San Bernardino quadrangle, 1954; southeastern part of the Jurupa Mountains, half a mile north of Sunnyslope and about 4 miles northwest of Riverside. Plant is at the northwest end of 27th Street.

Ownership: ^{Riverside Cement Company, Division of} American Cement Corporation, Riverside ^{mail office,} ~~Division,~~ P.O. Box 832, Riverside. Leased to and operated by Snow Rock Division (7000 27th Street, Riverside) Sun Valley Mills, Room 702, Glendale Federal Building, Glendale 3.

History: In 1953 the Sno-Top Rock Products Company began operating a limestone-crushing plant at Jensen quarry (described herein). White limestone and marble that contained excessive magnesia were trucked about half a mile to the plant from the quarry, then active as a source of limestone for cement manufacture. At the plant the material was crushed, screened, and bagged, mainly for white roofing granules. Fines were used for asphalt tile filler and other industrial purposes. Sno-Top discontinued operations in 1960 and in November, 1961, the plant was taken over and put into operation by Snow Rock who, in 1963, continue to make crushed limestone products.

Geology: Pre Cretaceous medium- to coarse-grained crystalline, light gray to white limestone (see Jensen quarry herein).

A

Development: Snow Rock utilizes part of the Jensen north quarry area. In January, 1963 quarrying is from a segment of the north Jensen quarry about 200 feet long with face about 75 feet high. After blasting rock is loaded by a $1\frac{1}{2}$ -yard dipper shovel on Euclid 15-ton end-dump trucks for transport to the plant. Some secondary breaking is done at the quarry utilizing jack-hammer drilling. At the plant trucks discharge to a Traylor 28-inch by 36-inch primary jaw crusher which feeds a surge bin. From the bin rock goes to a 10-inch by 20-inch secondary jaw crusher and then to an Overstrom vibrating screen. Oversize goes to a hammermill and then to 16-by-16 rolls. Final crushing in two small hammer mills to make the fine size reduces the material to minus 12 mesh. Finished material goes by elevator for storage in two silos. Most of the material is marketed in bulk, but some is bagged. Two sizes are produced, minus 12 mesh to minus 16 mesh; and minus $3/8$ -inch to plus $1/8$ -inch. The product is marked as white aggregate, mostly in the Los Angeles area under the trade name "Snow Rock". It is used chiefly to manufacture white concrete blocks and for white gunite sand.

Production: Plant capacity is 100 tons per day maximum, and about 60 tons if making fines only.

References: Gay, 1957, p. 574; Paul, Evans, and Young, 196—, p. —.
C.H.G. 1/23/63.

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Whitestone Deposit

Location: SE $\frac{1}{4}$ sec. 8, S $\frac{1}{2}$ sec. 9, E $\frac{1}{2}$ sec. 17, T. 2 S., R. 5 E., S.B.M., Joshua Tree quadrangle, 1955, and Thousand Palms quadrangle, 1958; south flank of Little San Bernardino Mountains along east Blind Canyon 3 miles northeast of Desert Hot Springs.

Ownership: Secs. 9 and 17, Southern Pacific Land Co., 65 Market Street, San Francisco 5, leased to Edwin T. Murphy and Harry Feldman (1959); claims in sec. 8, Edwin T. Murphy and Harry Feldman (1959).

History: Claims were located and some development done in 1959.

Geology: Several small pendants of crystalline limestone or dolomite occur in foliated biotite diorite gneiss and biotite schist (Chuckwalla complex). One carbonate body in the E $\frac{1}{2}$ sec. 17 is about 100 feet long, 8 feet thick, and concordant with the gneiss. This limestone is coarsely crystalline and white, but with tiny pink brucite crystals and patches of yellow serpentine (Proctor, 1958, p. 38). In the S $\frac{1}{2}$ sec. 9, a lens of *limestone* about 150 feet in diameter crops out.

Development: Undetermined.

Production: Undetermined.

References: Proctor, 1958, p. 38; *Paul Evans, and Harry Murphy, p. —*

C.H.G. 5/20/61.

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Whitlock Limestone Deposit

Location: NE $\frac{1}{4}$ and E $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 28, and secs. 27, 34, T. 6 S., R. 4 E., S.B.M., Idyllwild quadrangle, 1959; San Jacinto Mountains about 3 miles east of Kenworthy Station, at the head of Bull Canyon.

Ownership: Robert M. Harris, 2380 Monterey Road, San Marino owns 11 claims totaling about 1,200 acres. (1963).

History: These claims were located as association placers about 1929 by Alan M. Whitlock and associates. To date limestone has not been mined from this property but the limestone has been extensively sampled and explored by means of roads and open cuts. About 1953 the area was examined by the National Cement Company who planned to erect a cement plant at Hemet. Part of this plan included transporting limestone slurry by a pipe line from the quarry site to plant site over a distance of 29 miles with a drop in elevation of 3,900 feet. This proposal was abandoned for the announced reason that a zoning permit could not be obtained because of local opposition to the proposed plant site. Since 1953 the property has been examined by several limestone consuming industries but the distance from markets has delayed the commercial development of the Whitlock limestone. The claims are active and assessment work has been done each year.

X

Geology: The limestone deposits lie high on steep ridges several miles east of Garner Valley and are surrounded by granite. These carbonate rock bodies are part of a very large belt of pre-Cretaceous metamorphic rocks which trends northwest from just north of upper Palm Canyon near State Highway 74 to about one mile south-east of Tahquitz Valley. This mass of metamorphic rocks is mostly mica schist, but also contains hornblende schist, quartzite, and limestone and is about 15 miles long and ranges from about one to four miles in width. The metamorphic rocks are intruded by granite and several large irregular bodies of granite, as much as two miles long, occur in the central part of the metamorphic belt. The Whitlock limestone deposit lies along the western margin of the metamorphic belt near its southern end. Here the limestone-bearing sequence is several miles long

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and two or three thousand feet thick. The limestone ranges from coarsely crystalline bluish-gray rock to finer grained banded rock. It is friable at the surface and deeply jointed both northeast and at right angles to this trend. The apparent bedding is parallel to the main north to northwest-trending joint system. The limestone layers are somewhat interbedded with mica schist and some scarn rock and pegmatite dikes occur locally with quartz-rich pegmatites and scarn plentiful in small bodies near the granite contact. Granite intrusions, however, have not penetrated the limestone to any great extent. The largest continuous limestone bodies appear to be about 1,000 feet long and from 300 to 900 feet wide. In 1953 the Division of Mines collected one random type sample which was chemically analyzed by Abbot A. Hanks, Inc., San Francisco, as follows: Insoluble, 1.14% Al_2O_3 and Fe_2O_3 , 0.56%; CaO , 54.37%; MgO , 0.56%; P_2O_5 , 0.05%.

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From information furnished by Mr. Robert M. Harris (written communication, 1962) the average of 13 samples, each from a different part of the property, composed of 3 grab samples and 10 chip samples across limestone beds ranging from 30 feet to 350 feet in width was as follows: SiO_2 , 1.56%; Al_2O_3 and Fe_2O_3 , 0.92%; CaO , 52.8%; MgO , 1.21%; loss, 42.81%; and from 2 samples S, 0.0075%. These same samples showed the following ranges: CaO , 50.51-54.80%; MgO , 0.48-3.82%; SiO_2 , 0.30-3.15%; Al_2O_3 and Fe_2O_3 , 0.18-2.45%. Reserves of high-quality limestone apparently are very large. One private report estimated at least 900,000,000 tons in sight (personal communication, R. M. Harris, 1956).

Development: The deposit has been extensively sampled and a number of prospect pits, cuts, roads, and trails have been made in the course of development.

Production: By July, 1963, apparently none.

References: Fraser, 1931, map facing p. 540;
Sant, Evans, and Henry, 196—, p. —.
C.H.G. 7/2/63.

Hemet Magnesite Mine

Location: NW $\frac{1}{4}$ sec. 31, T. 5 S., R. 1 W., S.B.M., Winchester quadrangle, 7.5', 1953; 3 $\frac{1}{2}$ miles east and half a mile south of Winchester.

Ownership: The mine is patented, and in 1958, was owned by Mr. Roy Boswell of Los Angeles. Mr. Fletcher Nichols of Hemet held an adjoining claim on the same deposit (Schwarcz, 1958).

History: This magnesite deposit appears originally to have been discovered and explored in the search for gold (Hess, 1908, p. 38).

Between 1908 and about 1912 the deposit was worked for magnesite by the California Magnesite Co. for use as cement (Gale, 1914, p. 516). By 1917 this venture had failed and the mine was idle (Merrill and Waring, 1917, p. 119). In 1925 it was reported (Bradley, p. 61-65) that the mine had changed hands a number of times, that development and production had continued, and that the deposit was last mined in 1919 by the Welman-Lewis Co. of Los Angeles for Innes-Speiden & Co., Inc. of New York, lessees. By 1929 the machinery had been removed (Tucker and Sampson, 1929, p. 521). The mine has remained idle.

Geology: The Hemet Magnesite mine is on the crest of a northwest-trending ridge formed by the northeast flank of a northwest-plunging, overturned, isoclinal fold (fig. ___/). The rocks in the mine area consist of schist, gneiss, quartzite, and intensely altered limestone which have been intruded by amphibolite, peridotite, and pegmatite. The mine explored a magnesite-filled stockwork in a body of altered peridotite exposed on the ridge crest. The ore body is exposed through a horizontal distance of about 700 feet and has an average width of about 150 feet. Its depth has not been determined. The stockwork fillings of magnesite form intersecting veins ranging from a fraction of an inch to about 4 inches in thickness. Gale states (1914, p. 519) that recoverable magnesite comprises about 10 percent of the mined rock and gives the following analysis of the magnesite:

SiO_2	6.17%
$\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$	0.80
CaO	trace
MgO	43.80
CO_2	45.02
undet.	4.14

Schwarcz (1958) states that the vein material consists of an intergrowth of fine-grained magnesite and opaline silica. The peridotite matrix was studied in thin section by Schwarcz who gives the following composition:

Magnesite	15%
Olivine	1%
Enstatite	3%
Talc	20%
Irresolvable	60%
Matrix (magnesite, limonite, opal serpentine(?))	
Serpentine	tr.

Development: At present (1962) the underground workings of the mine are inaccessible. In 1925, Bradley (p. 62-64) gave the following description:

"Mining is done by open cut and glory hole. A tunnel has been driven N.60°E. in the main quarry floor to cut the deposit through drifts along the crebody running N.40°W. The south drift connects by a chute with the glory hole 50 ft. below the top, and a raise in the north drift has been put up to tap the glory hole. The latter gives backs of 75 ft. Drifting will be continued southeast to determine the length of the crebody. It was the intention of the operators to glory-hole the entire top of the hill."

"Surface equipment includes mechanical conveyors, screens, washers, a 6' x 60' rotary kiln, grinders and packing house."

A subsequent report (Tucker and Sampson, 1929, p. 521) states simply that:

"A cross cut at a lower elevation is connected with the glory hole by a series of raises."

Production: Undetermined but probably small. In 1925 the kiln capacity was reported to have been 30 tons of calcined magnesite per 24 hour day (Bradley, 1925, p. 65).

References: Hess, 1908, p. 38-39; Gale, 1914, p. 516-619; Merrill and Waring, 1917, p. 539; Tucker, 1921, p. 327-328; Bradley, 1925, p. 61-65; Tucker and Sampson, 1929, p. 521; 1945, p. 175, pl. 35; Schwarcz, 1958, unpublished.

R.B.S.

Nichols Magnesite Deposit

See: Hemet Magnesite mine.

Manganese

Manganese ore in grades ranging from 20% to 45% Mn has been produced in Riverside County in quantities exceeding 25,000 tons valued at more than \$1,500,000. Production has been sporadic, having been restricted largely to periods of the two world wars or the aegis of federal stockpiling programs (1953-1959). In Riverside County, the most productive manganese mining areas have been the north end of the McCoy Mountains and the southeastern end of the Little Maria Mountains. These two mountainous desert areas are in the ^{central} part of the county about 20 miles northwest of Blythe.

In these areas manganese oxides, of probable hypogene origin, form fissure and void fillings in fault-zone breccias. The country rock has been replaced to a limited extent. Replacement appears to be the greatest where the rock is carbonate. The ore is largely the hard, psilomelane type and the bulk of the mine-run material, which ranges from 10% to 35% Mn, has required beneficiation.

Mining has been both open pit and underground, both on a small scale. Milling facilities have operated at Inca siding and Ripley. By 1961 the Ripley plant had been dismantled but the Inca facilities were still available. The fines from the Inca plant were further refined at a small "Humphrys Spiral" plant just north of Blythe. Much of the ore milled at Ripley came from Imperial County.

With the closing of the government carlot program, August 5, 1959, manganese mining in Riverside County abruptly ceased.

Limestone, Dolomite, and Cement

Limestone production in Riverside County, a major mineral industry of the county, is estimated to be about one million tons each year. In 1963, most of this limestone was consumed in one portland cement plant, but limestone is also produced for roofing granules, white aggregate, asphalt tile filler, and other industrial purposes. Before the mid-1920's limestone was mined from deposits in the county for use in lime production and at times limestone from the county has been utilized for poultry grit, beet-sugar manufacture, broken and crushed stone, building and ornamental stone, and flux in iron foundries. In addition to these deposits and the deposits being currently quarried, the county contains substantial, but largely undeveloped, reserves of carbonate rocks. Apparently some of these carbonate bodies are composed of industrial grade limestone, but in other bodies limestone and dolomite are too complexly intermixed to permit exploitation of either limestone or dolomite. Large masses of high-grade dolomite have not been reported.

In 1963 some of the deposits suitable for industrial use still were too remote or inaccessible to be of immediate commercial interest but some probably will be placed in production within a few years. Because limestone and cement producers in Riverside County number fewer than three in each reportable category, production figures in 1961 were included with barite, gypsum, iron ore, peat, petroleum, and wollastonite, which had a combined value of \$33,769,768.

Commercial limestone production in Riverside County probably began about 1890 with the inception of a small lime industry. By 1895 several small kilns were operating in the northwestern San Jacinto Mountains in the vicinity of Lamb Canyon. At Crestmore, in 1905, two kilns were operating and the lime, about 75,000 barrels of which had been produced at that quarry, was known as "Lily White" lime. Stone from the Crestmore deposits also had been utilized for sugar-beet refining as well as for building and ornamental stone. Nearby deposits in the Jurupa Mountains have also been utilized for cement manufacture at Crestmore, and in recent years have been a source of roofing granules and white aggregate.

The portland cement industry in Riverside County began in 1909 when the Riverside Cement Company completed a dry-process plant at Crestmore. In 1958 an extensive modernization and expansion program was started at Crestmore and was nearing completion by the end of 1963. In mid-1961 a new white cement plant, built adjacent to the existing gray cement plant, went on stream. This plant is one of only 5 white cement plants in the United States and was the first new white cement plant built in this country in many years.

For many years before 1942 the City of Riverside mined limestone from The New City quarry on Central Avenue for use in oil and macadam construction of city streets. Poultry grit was mined from a nearby deposit during 1938-1945. One deposit in the Jurupa Mountains west of Riverside was also mined for poultry grit in the late 1920's as were two deposits in Bautista Canyon southeast of Hemet. In the mid 1940's the Jurupa Mountain deposit was a source of foundry stone.

Since the 1950's limestone deposits near Nightingale at the north margin of the Santa Rosa Mountains have been under development as a source of roofing granules, ornamental stone, and other limestone products. Similar developments are under way in the Big Maria Mountains, a few miles northwest of Blythe at the east end of the county.

Limestone and dolomite bodies in Riverside County are parts of roof pendants of metamorphosed sedimentary rocks which have been intruded by granitic rocks. The metamorphic rock masses include quartzite, schist, hornfels, and contact-rocks, as well as the carbonate rocks, which are minor in most pendants. Few of the metamorphic bodies have been mapped in detail and little direct evidence of the age of the original strata has been found, but all apparently are pre-Cretaceous in age.

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B

Most of the carbonate rock deposits in Riverside County occur in three areas, the northwestern tip, the west-central part, and the northeastern part of the county. In the northwestern tip of the county isolated roof pendants containing limestone-bearing metamorphic rocks of Mesozoic or Paleozoic age occur at Crestmore and in the Jurupa Mountains. To date these deposits provide the principal source of commercial limestone in the County. Several large undeveloped deposits exist in the northern and southern parts of the San Jacinto Mountains in the west-central part of the county. Among the more promising of these are the Guiberson and Sims deposits at the low north edge of the San Jacinto Mountains, and the Whitlock deposit high in the southern part of the mountains. These deposits apparently contain high-calcium, low-iron limestone, but also contain intermixed dolomite and dolomitic limestone. In the northern Santa Rosa Mountains limestone deposits near Nightingale have been mined intermittently on a small scale in recent years and significant reserves of high-quality limestone

apparently remain. These carbonate bodies, as well as numerous smaller bodies in the Santa Rosa and San Jacinto Mountains, are part of a thick and widely exposed sequence of pre-Cretaceous metamorphic rocks that is composed^{mostly} of mica schist and quartzite. Extensive deposits of limestone, dolomite, and dolomitic limestone occur in the Big and Little Maria Mountains in the northeastern part of Riverside County, about 15 miles northwest of Blythe. These deposits, of the Paleozoic(?) Maria Formation, are included in a thick sequence of quartzite, wollastonite-bearing rock, and schist. During the past several years efforts have been made to develop these deposits as a source of roofing granules and other limestone products. In the north-central part of the county carbonate rocks occur in the Eagle and Little San Bernardino Mountains, but large masses of pure limestone or dolomite are not presently known. These deposits, except for one or two small roofing granule operations during the 1950's, are undeveloped.

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Best Ranch Deposit*

~~This report is based largely on information~~
~~contained in a recently published description by Engel and~~
~~Gay, and Rogers (1959, p. 97-99).~~

Location: Sec. 23, T. 5 S., R. 4 W., S.B.M., U.S.
Army Corps of Engineers Lake Elsinore quadrangle, 1942;
about 2½ miles northeast of Elsinore, and one mile south-
east of Highway 74.

Ownership: John A. Snyder, Route 2, Box 220, Perris,
holds (1959) patent to 160 acres including the old quarry
site and kilns.

History: Two stone kilns, each about 25 feet tall,
stand about 150 feet northwest of the deposit. Made of
country rock, the kilns were built sometime prior to
1890, and reportedly produced a good quality of lime
(Goodyear, 1890, p. 151). A plan to manufacture hydraulic
cement was unsuccessful and the property has been idle
since 1890.

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Geology: A discontinuous line of elongate limestone bodies strikes N. 75° W. parallel to the bedding of surrounding slate. The deposit dips about 50° N.E. Though limestone is exposed through a strike distance of half a mile or more, only the largest body, measuring about 75 feet in maximum width and 100 yards or more in exposed length, was developed. The adjacent outcrop, about 200 yards to the northwest, is approximately 50 feet wide and at least 100 feet long. Outcrops are partially obscured by soil.

The limestone is massive, light- to dark-gray and characteristically mottled. An undetermined but apparently small proportion of dolomitic material is present locally. Silica is present in the form of cherty and jaspery streaks and small pods as much as several inches wide and several feet long. Silica increases in abundance towards the east end of the main outcrop. Abundant unoriented silky sheafs of tremolite blades occur in at least one zone that covers an area of about 75 square feet near the southern edge of the main outcrop. The limestone is silicified adjacent to a steeply dipping aplite dike which strikes N. 80° W. across the southern margin of the main body.

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Development: A five-foot pit and a bench 20 feet long and as deep as 3 feet are cut in the west end of the main outcrop. A 60-foot crosscut adit driven S. 30° W. through the next outcrop to the northwest established a 50-foot width of limestone at a depth of 15 feet.

Production: Undetermined. The small size of the quarry and unworn condition of the kilns indicate that very few tons of lime were produced.

References: Goodyear, 1890, p.151; Engel and others, 1959, p. 97-99, pl. 2; Saul, Evans, and Henry, 196—, p. —.
C.H.G. 1/7/64.

Blind Canyon Deposit

Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 18, T. 2 S., R. 5 E., S.B.M.,
Palm Springs quadrangle, 1957; south margin of the
Little San Bernardino Mountains on the west side of
Blind Canyon, 2 miles north of Desert Hot Springs.

Ownership: Metropolitan Water District of Southern
California, ^{1111 Sunset Blvd} ~~306 West Third St.~~, Los Angeles.

History: During 1960 a small tonnage of limestone
was quarried for roofing granules and/or ornamental
stone and used in the Desert Hot Springs area. Idle 1961.

Geology: An irregular lens-shaped pendant of pre-Cre-
taceous impure limestone (of the Chuckwalla complex)
strikes northwest along the ridge west of Blind Canyon.
The limestone body has a maximum width of 500 feet and a
length of 1,500 feet, but is interleaved with biotite
schist and contains fingers of granitic rock. The lime-
stone is fine to coarsely crystalline and is discolored
along yellow-green serpentized zones, but contains
small patches of white material.

Development: Several faces in a small canyon have been
blasted down, but there is no regular quarry.

Production: Undetermined, but apparently only a few
tens of tons.

References: ^{Sand, Evans, and King, 1961, p. —}
~~None.~~

C.H.G. 5/20/61.

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California Limestone Products

(Big Maria Mountains) Limestone Deposits

Location: Secs. 20, 21, 22, 27, 28, 34, 35 (proj.).
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T. 4 S., R. 22 E., S.E.M., Big Maria Mts. quadrangle,
1951; about 15 miles northwest of Blythe ^{via Midland Road} on the western
slope of the central part of the Big Maria Mountains,

about 5 1/2 miles east of Inca ^{Little Maria Mountains may include an area in the southeastern}
Little Maria Mountains (secs. 17, 18, T. 4 S., R. 21 E., S.E.M., Midland quadrangle, 1952) about
2-3 miles northwest of Inca ^{Holdings}
Ownership: California Limestone Products, 139 South

Beverly Drive, Beverly Hills holds claims totaling over
3,000 acres in the ^{west central Big Maria Mountains and in the southeastern part of the} Big and Little Maria Mountains. In

1962 the General Minerals Corporation, 300 Sixteenth
Street, Denver, Colorado (Box ^{Route 1, 55} 13, Blythe) leased
placer claims totaling 3,560 acres from California Lime-
stone Products.

Purchased by Chas. Pfizer Co. late 1965.

History: Development of these properties by California Limestone Products started in 1951, when the company was incorporated. They continued active development work throughout the 1950's and sought to develop markets for ornamental marble, terrazzo chips, roofing granules, and lime. Limestone products, however, apparently were never marketed by California Limestone Products who were chiefly engaged in mining manganese and in the development of wollastonite for use in the manufacture of rock wool. Since 1962 the General Minerals Corporation has been developing the limestone deposits for terrazzo chips, roofing granules, poultry grit, and other limestone products. In February 1963 they had a small grinding plant in operation at the former Woolstone Corporation plant in Blythe located near Midland Road and the Santa Fe Railroad (NE¹/₄ sec. 6, T. 6 S., R. 23 E., S.B.M.).

In May 1964 General Minerals was mining and processing for terrazzo chips several colors of green and red quartzite and lime silicate rocks from their Big Maria Mountain properties. These are marketed under the name Gem Stone Terrazzo Chips. The stone is also sold for roofing granules and building stone. Limestone was not being mined at this time.

X

Geology: Extensive deposits of limestone, dolomite, and dolomitic limestone occur in the Big Maria Mountains. These deposits are included in a thick sequence of quartzite, wollastonite-bearing rock, and schist of the Paleozoic (?) Maria Formation which has been much deformed. Carbonate rock bodies are as much as 3 miles long and one mile wide, and irregularly-shaped carbonate bodies are as much as 2 miles in diameter. Bodies which are chiefly limestone are as much as $1\frac{1}{2}$ miles long and half a mile wide. Some crystalline limestone masses locally contain gypsum and there are large bodies of siliceous dolomite with quartzite. The principal limestone bodies observed, and which apparently lie within California Limestone Products properties, are mostly in sections 21, 27, 28, and 34, 35 (proj.), T. 4 S., R. 22 E., S.B.M. ^{26,} _{(Fg. 1).} ^A In sections 34 and 35 (proj.) white to buff, fine to medium crystalline limestone crops out in a northwest-trending and gently northeast-dipping layer more than $1\frac{1}{2}$ miles long and ranging from 500 to 2,000 feet in width. About one mile to the northwest in sections 21, 27, and 28 (proj.) a sequence of metamorphic rocks strikes northwest and dips

about 50° northeast. Here the basal unit is a limestone layer about 100 feet thick and exposed along the strike for about 3,000 feet. This lower limestone is overlain by 500 feet of quartzite, schist, and wollastonite-bearing rock which is overlain by an upper limestone unit. This upper limestone layer ranges from 800 to 2,000 feet in width and has a strike length of about 3,000 feet. It is intruded by dark sills and faulted against schist. The lower carbonate unit (in secs. 27, 28; samples 1-4 below) is white to faintly salmon, massive, dense, fine to medium crystalline limestone and dolomite which weathers buff or light tan. The lower 150 feet (of an 800-foot wide exposure) of the upper carbonate unit (in sec. 21; samples 5-8 below) is off-white to white, massive, dense, fine to medium crystalline limestone, with some friable layers. Eight samples collected by the Division of Mines in March, 1956, and chemically analyzed by Abbot A. Hanks, Inc., San Francisco, were as follows:

ation	Sample no.	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	CaO	MgO	P ₂ O ₅
limestone unit, 27, 28, T4S, R22E, Type grab spls. 00-ft. section.	1	1.31%	0.11%	0.22%	54.41%	0.35%	0.01%
	2	0.42	0.15	0.17	30.05	21.67	0.02
	3	0.12	0.15	0.34	55.28	0.22	0.01
	4	0.33	0.18	0.40	54.92	0.29	Trace
limestone unit, 1, T4S, R22E, Type grab spls. 50-ft. section	5	2.94	0.11	2.76	47.69	3.92	0.16
	6	1.81	0.11	1.61	52.53	0.96	0.11
	7	7.20	0.16	4.58	48.80	0.29	0.10
	8	2.87	0.11	3.18	48.20	3.34	0.12

Development: Open cuts and prospect pits.

Production: Undetermined. Probably a few thousand
tons, or less.

References: none.

5/20/64
C.H.G. 3/29/63.

λ

Castro Quarry (Magstone Products)

Location: N $\frac{1}{2}$ N $\frac{1}{2}$ W $\frac{1}{2}$ sec. 1, T. 3 S., R. 5 W., S.B.M.,
Riverside East quadrangle, 7 $\frac{1}{2}$ ', 1953; isolated, low hill,
a quarter of a mile east of the intersection of Arlington
Avenue and the Gage Canal, in the City of Riverside.

Ownership: Loren Creed, Riverside (1945). Undeter-
mined (1963).

History: Apparently the Castro quarry is the site of
the former Magstone Products operation described by
Tucker and Sampson (1945, p. 173). From 1933 to 1945
Howard Small, Riverside, operating under the name
Magstone Products, was a producer of limestone. The
stone was hauled to a plant on North Main Street in
Riverside where it was crushed and screened. The material
was sold as poultry grit and as limestone flour for use
in poultry feeds. In 1945 the plant had a capacity of
8 tons per day. Production has not been reported since
1945 and the quarry has apparently been idle since that
date. Residential construction was underway adjacent
to the quarry in 1963 and it appears unlikely that the
quarry will be reopened.

Geology: The quarry area is underlain by poorly exposed pre-Cretaceous limestone, schist and skarn intruded by quartz diorite. Larsen (1951, plate 1) assigned the metamorphic rocks to the Paleozoic and the intrusive rocks to the Cretaceous Bonsall Tonalite. The metamorphic sequence strikes about N. 35° E. and appears to dip about 50° SE. The limestone is medium to coarse crystalline, gray to white. The exposed mass of limestone and skarn is 400 feet long and 30 to 45 feet wide. The limestone is in two bodies, a north body about 350 feet long and 25 to 45 feet wide, and a small south body about 35 feet long and 10 feet wide. The two limestone bodies are separated by about 20 feet of skarn.

Development: Three side-hill cuts have been made in the limestone. The south mass and adjacent skarn contains one irregular quarry about 80 feet long more or less along the strike, and 5 to 20 feet wide. About 100 feet to the north an irregular quarry across the north mass is about 40 feet by 45 feet; 70 feet north of this quarry is a semicircular quarry about 40 feet long on the strike of the limestone and about 20 feet wide.

X

Production: Total undetermined, probably a few thousands of tons.

References: Tucker and Sampson, 1945, p. 173; Logan, 1947, p. 271; Larsen, 1951, plate 1; Saul, Evans, and Gray, 196—, p. —. —. C.H.G. 7/31/63.

Glen Avon (Mathews, Mira Loma) Limestone Deposit

Location: SW $\frac{1}{4}$ sec. 2, T. 2 S., R. 6 W., S.B.M., San Bernardino quadrangle, 1954; southern slope of the western Jurupa Mountains, north of Glen Avon Heights at the north end of Fleming Street and about 7 miles northwest of Riverside.

Ownership: Mark Tungate, 275 Larchmont Blvd., Los Angeles (1942). Undetermined (1963).

History: Quarry opened about 1928 by W. B. Mathews, 1032 North Oakland Street, Pasadena. For several years limestone was shipped to Los Angeles where it was ground for poultry grit. After a long period of idleness the property was again active in 1942 and was then known as Mira Loma Dolomite. Miller Brothers Truck Company was the operator in 1942 and was shipping rock at \$4.75 per ton to Bethlehem Steel Company and other iron foundries in Los Angeles. A crushing and screening plant was located just below the quarries. The property has been idle since before 1950.

Fairmount Hill Quarry (Old City Quarry) North Hill Quarry

Quarrying is being done for the purpose of obtaining
limestone for the manufacture of cement.

Quarrying is being done
for the purpose of obtaining
limestone for the manufacture of cement.

X

Geology: Limestone occurs in two parallel lens-like bodies within a bedded sequence of siliceous metasedimentary rocks. This metamorphic sequence has been termed the Jurupa Series of questionable Paleozoic age, but some workers believe it may be Triassic (Mackevett, 1951, 14 p.). The limestone bodies dip steeply north and strike nearly due east. They have maximum exposed dimensions of about 1,000 feet long and 80 feet wide, and are separated by about 80 feet of schist. In places the limestone has been intruded by small fingers of granitic rock. The limestone is light gray to white, medium- to coarse-grained crystalline material, and is faintly banded.

A

Development: The upper limestone body has been mined at its east end by means of two open cuts parallel to the strike of the body. Each cut is about 150 feet long, 25-30 feet wide with 30-foot maximum depth. About 500 feet downslope to the southwest the lower limestone body has been explored by two small circular quarries, each about 20 feet in diameter and 20 feet deep.

Production: In mid 1929 shipments of 150 tons per month were made to Los Angeles and total shipments to that time were 500 tons. In September, 1942, shipments were 500 tons per month. Later shipments, if any, unknown. Total production probably no more than several thousands of tons.

References: Tucker and Sampson, 1929, p. 516; Tucker and Sampson, 1945, pl. 35, nos. 239, 240; Mackevett, 1951, 14 p., pl. 1; Saul, Evans, and Gray, 196 — p. —.

C.H.G. 1/21/63.

Guiberson (Whitewater) Deposit

Location: SE $\frac{1}{4}$ sec. 22, NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 23, T. 3 S., R. 3 E., S.B.M., Palm Springs quadrangle, 1957; steep north margin of the San Jacinto Mountains, adjacent to San Gorgonio Wash three quarters of a mile south of Palm Springs Station, within the Palm Springs city boundary.

Ownership: S. A. Guiberson, 1000 Forrest Avenue, Dallas, Texas (1945). Undetermined (1963).

History: In 1894 (Crawford, p. 393) mentioned an undeveloped "white marble" at this location. By 1929 this property, which included 160 acres, had been explored by means of three adits driven south from San Gorgonio Wash and a number of open cuts. During the 1930's the Metropolitan Water District of Southern California examined the deposit (5 drill holes were put down) to determine its suitability for the manufacture of portland cement to be used in construction of the Colorado River Aqueduct. In 1955 the United States Cement Corporation examined the area in connection with their proposed cement plant near Cabazon. Opposition by residential property interests was the announced reason for abandoning the project. Apparently such continuing opposition precludes the exploitation of this deposit.

✓

Geology: A sequence of pre-Cretaceous schists and carbonate rocks strikes about N. 50° W. and dips 65° NE. The limestone is white to gray and medium to coarsely crystalline. In places thin limestone beds 2-10 feet thick occur interbedded with mica schist, but much of the carbonate rock is massive and uncontaminated by other sediments. The limestone is, however, in some places contaminated by granitic dikes, dolomite, and schist. On the Guiberson property the area which is underlain mostly by carbonate rock is about 1,500 feet long and has a maximum width of 1,000 feet. This carbonate mass extends southeast into the Southern Pacific deposit (see herein) and the entire mass is about 4,000 feet long with a maximum width of 1,250 feet. According to Tucker and Sampson (1945, p. 172) five drill holes on the Guiberson property penetrated a maximum thickness of 110 feet of limestone, and that was not continuous. Reserves of carbonate rock are large but the quality of rock throughout the deposit is not known. Tucker and Sampson (1929, p. 516) listed one analysis as follows: SiO_2 , 0.74%; Al_2O_3 , 0.004%; Fe_2O_3 , 0.008%; CaO , 53.29%; MgO , 2.39%.

X

Development: Three short adits and a number of open cuts.

Production: By 1947 no production of limestone had been reported from this deposit, and apparently there has since been none.

References: Crawford, 1894, p. 393; Tucker and Sampson, 1929, p. 515-516; Tucker and Sampson, 1932, p. 6, pl. 1; Tucker and Sampson, 1945, p. 172; Logan, 1947, p. 271); *Saul, Evans and Bray, 196—, p. —.*
C.H.G. 7/2/63.

Jensen Quarry

Location: SW $\frac{1}{4}$ sec. 5, T. 2 S., R. 5 W., S.B.M.,
San Bernardino quadrangle, 1954; southeastern part of
the Jurupa Mountains, half a mile north of Sunnyslope
and about 4 miles northwest of Riverside.

Ownership: Riverside Cement Company, Division of
American Cement Corporation, Mill Office, P.O. Box 832,
Riverside.

History: Jensen quarry was apparently opened during World War I by the Riverside Cement Company as a source of limestone for the company's cement plant at Crestmore, 2½ miles to the east. The quarry was shut down in 1927 and large-scale operations were not resumed until 1948 when Jensen quarry again became the major source of limestone for the Crestmore plant. In February 1954 the underground mine at Crestmore was shut down and Jensen quarry supplied all the limestone until March, 1955 when work started on a new underground mine at Crestmore. This mine went on full production in June, 1956 and limestone from the Jensen quarry has not since been utilized for portland cement manufacture. From 1953 to 1960 Sno-Top Rock Products Company produced limestone roofing granules and fines for asphalt tile filler and other industrial purposes from Jensen quarry at a small crushing and screening plant on the property. In November 1961 this operation was taken over by Snow Rock (see herein) who early in 1963 were producing white aggregate from the Jensen north quarry.

A

Geology: Limestone, associated with sileaceous metamorphic rocks and intruded by Cretaceous Bonsall Tonalite, crops out in the quarry area over a crudely triangular-shaped area about 2,000 feet by 1,500 feet in plan. The limestone bodies strike northeast, dip 60°-80° S.E., and have apparent maximum thicknesses of at least 200 feet. The metamorphic complex has been termed the Jurupa Series of questionable Paleozoic age but some workers believe it may be Triassic. The limestone crops out boldly, is white, and is mostly medium- to coarse-grained calcite. Abundant graphite is disseminated in some of the limestone beds, and periclase, brucite, and hydromagnesite also occur. Rarer minerals such as spinel, pyrite, and diopside also occur and the mineral assemblage has been listed by Cooney (1956). Two undeveloped limestone bodies crop out in the SE $\frac{1}{4}$ sec. 6 west and south of the Jensen quarry. The larger body is about 1,500 feet west of the quarry. It trends nearly north and is about 750 feet long and 350 feet wide. About 2,500 feet southwest of the quarry a somewhat hourglass-shaped body trends northeast and is about 1,000 feet long and ranges from less than 100 feet to more than 400 feet in width.

Development: The quarry includes three principal workings: the south quarry, the main quarry, and the north quarry. The south quarry is about 320 feet in an easterly direction and 200 feet wide with maximum height of faces about 100 feet. The main quarry, in the central part of the limestone area and which furnished most of the limestone for cement manufacture since 1948, is nearly 450 feet long in a northwesterly direction and 200 feet wide. The north face is 230 feet high and the south face is about 100 feet high. The north quarry is irregular but has a total length of nearly 1,000 feet and has a steep southern face with maximum height of about 150 feet. This is the only quarry presently active (January, 1963) and is quarried by Snow Rock for white aggregate.

Production: Total production is undetermined, but apparently is several million tons. Early in 1963 production was about 100 tons per day.

References: Mackevett, 1951, 14 p.; Cooney, 1956; *Sand, Evans, and Murray, 1956 —, p. —.*
C.H.G. 1/21/63.

Iron

Iron

The large bodies of metamorphic rock exposed in the eastern half of Riverside County contain scattered masses of massive magnetite. The largest of these magnetite bodies is in the Eagle Mountains. Indeed, the Eagle Mountains deposit is the largest known deposit of iron ore in the west (see Eagle Mountain mine herein). In 1956 this ore body contained estimated reserves of 43,000,000 long tons (Gay, 1957, p. 247), a figure which must since have been revised upward on the basis of subsequent exploration.

In 1948 Kaiser Steel Corporation started utilizing ore from the Eagle Mountain mine as a source of blast furnace feed. By 1956 the mine had yielded 9,800,000 tons of blast furnace ore. Since 1956 mining and beneficiating efficiency and capacity have steadily increased at the mine in response to demands of the expanding and increasingly modern furnaces, mill, and fabricating plant at Fontana, and fabricating plants at Napa and Montebello. The productive capacity of the Kaiser mine will find further outlet in export shipping capacity to be made available with the completion of a new bulk loading facility for ships at the Port of Long Beach (Davis and others, 1962, p. 3,4). This new facility will have a capacity of 2,800 tons per hour.

The ore body at the Eagle Mountain mine was the only one being actively mined in Riverside County in 1962. Small deposits in the Palen and Maria mountains have been examined and one, the Iron King and Queen (see herein), has been extensively prospected and may soon be developed.

Black Giant Iron Deposit

Location: Secs. 34 and 35 ?, T. 3 S., R. 13 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Eagle Mountains, about 1 mile west of the Iron Chief Mine, and 10 miles northeast of the East Pinto Basin-West Pinto Basin-Cottonwood Pass and Black Eagle mine roads intersection.

Ownership: Carl Saure and A. Vrbanac, 8312 California Avenue, Whittier, own 11 unpatented claims (March 1958).

History: Undetermined.

Geology: Thin but irregular and discontinuous pods and lenses of replacement magnetite occur in calcitic dolomite.

Development: The property is essentially undeveloped and only shallow open cut and assessment work have been done. A good dirt road connects the property with the Black Eagle mine road. It is at an elevation of 2200 feet.

Production: Undetermined.

References: None.

J.R.E. 3/17/60

East Wide Canyon Iron-titanium deposit*

Location: NE $\frac{1}{4}$ sec. 17, T. 2 S., R. 6 E., S.B.M.,
Thousand Palms quadrangle, 1958, and Joshua Tree quad-
rangle, 1955; in Joshua Tree National Monument, 5 miles
north of Fan Valley, on the southeast side of a steep
hill on the east side of upper East Wide Canyon.
Reached by about 5 miles of foot trail from the end of
the road in East Wide Canyon.

Ownership: Southern Pacific Land Company, 65 Market
Street, San Francisco 5.

History: The deposit has not been mined but was
examined by Southern Pacific Company geologists in 1957

(Papke, K. G. and ot
included geologic map
ration of iron and ti
Bureau of Mines, Reno

Eagle Mtn. iron deposit
(Kaiser) - geology described
extensively in Bull. 129,
"IRON RESOURCES OF CALIF." (1948)
pp. 1-25 (Chap. A).

*Adapted from an unpu
and others, courtesy

For innovations in ore processing
beneficiation & milling see Trade
journals (eg. Engineering & Mining Journal)

Geology: The region is underlain by the Chuckwalla complex of Miller (1944, p. 16-21). In sec. 17 and vicinity these rocks include medium- to coarse-grained, slightly foliated quartz monzonite and diorite gneiss. In most exposures, foliation in the gneiss strikes northeast and dips northwest. Most of the granitic bodies appear to be crudely aligned with the northeast-trending gneissic foliation. Northwest-trending faults cut the area into blocks.

In the NE $\frac{1}{4}$ sec. 17 iron and titanium rich gneiss occurs in several layers conformable with the gneiss and quartz monzonite. The iron-titanium layers strike northeast with an average dip of 45° NW. The exposed strike length of the mineralized gneiss is about 1,300 feet, with average total thickness of the two principal layers of iron-titanium about 55 feet. The southwest end of the mineralized zone apparently is terminated by a fault intruded by an acidic dike. On the northeast the mineralized zone appears to pinch out, but mica-rich gneiss with some iron-titanium lenses crops out farther northeast beyond the mapped area.

The principal minerals present are magnetite, ilmenite, and goethite. Although most of the titanium is in the form of ilmenite some may occur as small grains of rutile. Assays and magnetic-separation tests suggest the material may have the following approximate composition: magnetite 60 percent; ilmenite 20 percent; goethite, silicates, and other minerals 20 percent. Six samples taken across the southwest end of the main mass averaged 45.9 percent Fe, 19.5 percent TiO_2 , 10.8 percent Si, trace P, and 0.07 percent S.

Development: None, other than geologic mapping and sampling. Papke and others (1957, p. 4) estimate a total of about 1,500,000 long tons of material averaging more than 43 percent iron and 17 percent titanium oxide would be available per 100 feet of slope depth.

Production: None.

References: Miller, 1944, p. 16-21; Papke, 1957, 7 p. C.H.G. 8/8/61.

Iron Cap (Maria Mountains Iron Deposit) Claims

Location: NW $\frac{1}{4}$ sec. 14, NE $\frac{1}{4}$ sec. 15 (proj.), T. 4 S., R. 22 E., S.B.M., Big Maria Mountains, quadrangle, 1954; on a narrow ridge in the center of the Big Maria Mountains, 24 miles, by road and ^{3 miles by} foot trail, north of Blythe.

Ownership: Not determined (1959).

History: Tucker and Sampson (1945, p. 146) briefly noted these claims as the "Maria Mountains Iron Deposit." J. O'Connell, Blythe, was the owner but no mention was made of development or activity.

Geology: Several elongate bodies of magnetite, containing some hematite, cap the crest of a narrow northwest-trending limestone ridge. The outcrop area of the magnetite body is about 1500 feet long and as much as 200 feet wide. The maximum thickness was not determined but it is probably less than 100 feet. The regional trend of the limestone and schist country rock is about N. 60° W. with dips of 20° to 30° southwest. Where the limestone contacts and intergrades with the iron ore it is sheared and contorted. The magnetite appears to have replaced the limestone. In some exposures near the margin of the ore body it is apparent that mineralization advanced more rapidly along some beds than others.

Where the host rock is contorted, interposed ore is also contorted. Along the base of the ore bodies the host rock is strongly sheared and altered to epidote and tourmaline-actinolite schist. This shear zone contains sparse copper mineralization as fissure fillings and coatings of chrysocolla and malachite.

The volume of iron ore float in the alluvium and stream channels to the east and west of the deposit probably exceeds that of the ore remaining in place.

Development: Four shallow prospects and one 30-foot adit explore the shear zone underlying the magnetite ore bodies in an apparent quest for copper ore. No evidence was found indicating removal or exploration of the magnetite.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 146.

R.B.S. 1/13/59.

Iron Cap and Iron King Claims

Location: SE $\frac{1}{4}$ sec. 19 (proj.), T. 5 S., R. 18 E., S.B.M., Sidewinder Well quadrangle, 1952; on the southwest flank of the Palen Mountains, 16 miles east-northeast of Desert Center.

Ownership: John J. O'Connell, 437 N. Oakhurst Drive, Beverly Hills.

History: When first reported (Tucker and Sampson, 1945, p. 146, pl. 35) this property was held by Jack O'Connell and C. J. Hill, Beverly Hills.

Geology: This deposit is exposed on the sides of a shallow ravine cut in the south flank of a ridge of altered metavolcanic and metasedimentary rocks. The head of the ravine lies athwart a vertical to-steeply-north-dipping shear zone which strikes east-west and appears to be as much as 300 feet wide. Within the shear zone the country rock is altered to a mixture of quartz, epidote, and calcite, and in part replaced by irregular, lenticular masses of magnetite.

Individual bodies of magnetite as much as 15 feet in thickness and 50 feet in lateral extent are exposed but the bulk of the iron deposit appears to comprise swarms or zones of small bodies averaging perhaps 3 feet in thickness and 15 feet in exposed length. The magnetite is fractured and as the host rock has weathered the iron oxide bodies have crumbled to a litter of float. Thus the full extent or number of magnetite bodies is difficult to estimate. The ore bodies appear to be unevenly distributed across the full width of the shear zone and to have a lateral extent of about 400 feet. Surface indications of iron mineralization extend only 30 to 40 feet up the east slope of the ravine. The western limit of the deposit is concealed beneath a wash.

The chief impurities in the magnetite appear to be unreplaced bodies of altered country rock the most common constituent of which ^{is} (appears to be) epidote. One specimen of magnetite float contained perhaps as much as 20 percent by volume of slender, prismatic apatite crystals. The ubiquity of this undesirable impurity was not determined.

Several hundred feet south of the head of the ravine, the ridge along its west side is crossed by several crushed and sheared quartz veins. They strike approximately N. 10° E., dip steeply northwest, and range from 0 to about 1 foot in thickness. They contain chrysocolla and malachite as crusts and veinlets associated with scattered, small pockets of iron oxides. One vein has been prospected for gold.

Development: The magnetite deposit has been opened through an open trench about 15 feet long and 6 feet deep at the face, and several shallow prospect pits.

A single 15 foot vertical shaft has been sunk in one of the narrow quartz veins. The collar is timbered and set with concrete.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 146, pl. 35.

R.B.S. 3/16/62

Iron King and Iron Queen Claims

Location: $S\frac{1}{2}SW\frac{1}{4}SW\frac{1}{4}$ sec. 21 (proj.) and $N\frac{1}{2}NW\frac{1}{4}$ sec. 28 (proj.), T. 5 S., R. 18 E., S.B.M., Sidewinder Well quadrangle, 1952; on an isolated foothill at the south end of the Palen Mountains. These claims are at the end of an unimproved, sandy road which extends north $7\frac{1}{2}$ miles from U.S. Highways 60 and 70 at a point $19\frac{1}{2}$ miles east (by road) of Desert Center.

Ownership: S. E. Chiapella, 14208 Chandler Blvd., Van Nuys and John J. O'Connell, 437 No. Oakhurst Dr., Beverly Hills (1962).

History: This property has been extensively prospected but has not yet (1962) been systematically mined.

Geology: The area of the Iron King and Queen Claims is underlain by greenstone. The claims lie on a faulted and sheared zone as much as 100 feet wide which strikes about N. 75° W., dips 75° SW. The lateral extent of the fault was not determined. Lenses of massive magnetite lie in the fault^V where it is exposed on the east flank of a ridge (zone). The largest magnetite body exposed is about 60 feet thick near the base of the ridge and narrows to a termination just below the ridge crest; a surface distance of about 300 feet. The main ore body appears to be flanked by at least two smaller lenses a few tens of feet in exposed length. One of the smaller bodies is a porous mass near the hanging wall just below the ridge crest, the other is an apatite rich lense near the footwall at about the same level. The ore bodies have gradational contacts with, and contain isolated horizons of the country rock. They appear to be replacement deposits. In addition to contamination by included country rock the magnetite contains an undetermined but apparently high proportion of unevenly distributed apatite crystals.

No magnetite bodies were noted northwest of the ridge crest. Southeast of the ridge the main ore body is concealed by alluvium, but it appears to thicken both in that direction, and down the dip of the fault.

Development: This deposit has been exposed in an open cut at the base of the ridge and four evenly spaced bulldozer cuts on its east slope (Photo ___/).

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 146, pl. 35.

R.B.S. 11/28/62.

MWS 11-78 (DPS)

Lang Mine

See: Sulphide Bismuth mine.

Lindy Loop #1 Deposit

Location: NE¹/₄ sec. 36, T. 4 S., R. 22 E., S.B.M.
(proj.), (^{ant}U. S. Geological Survey) Big Maria Mountains
quadrangle, Calif.-Ariz., 1951; Big Maria Mountains,
about 12 miles north of Blythe.

Ownership: Alfred E. Lindburgh, P.O. Box 517, La
Habra, owns at least one unpatented claim (~~December~~^{March} 1958).

History: Undetermined.

Geology: A northwest-trending fault that dips 51° SW.
separates coarse grained limestone in the hanging wall
from wollastonite-bearing ^{carbonate} rock in the foot-wall. Both
of these rock units are members of the McCoy formation
(Miller 1944, p. 32). A gouge zone as much as 15 feet
thick contains mineralized veins composed principally
of spongy hematite, altering to limonite, with stringers
of dirty-green epidote, and possibly some gold. Portions
of the wall rock along the fault are stained blue by a
secondary copper mineral, probably chrysocolla. The
hematite veins are elongate, semi-tabular, and tend to
pinch and swell. A kidney 2 feet in maximum width was
observed. Locally the wollastonite-bearing rock has
been replaced by magnetite. An irregular replacement body
a few tens of feet wide occurs low on the west slope of the
hill between a prospect pit and the dirt road leading from
the workings.

Development: Several open cuts and prospect pits expose the veins along the fault zone. A jeep road leads from the property to a junction with the Midland road about 9 miles southeast of Midland. Elevation of the property is about 1150 feet and it is idle.

Production: Undetermined.

References: Miller, 1944, p. 32.

J.R.E. 12/17/58.

Maria Mountains Iron Deposit

See Iron Cap Claims.

Red Ocher Deposit

See herein under tungsten.

Sulphide Bismuth (Lang) Mine

Location: NE¹/₄ sec. 11, T. 2 S., R. 7 E., S.B.M., Twentynine Palms quadrangle, 1955; Joshua Tree National Monument, on the north slope of the Little San Bernardino Mountains on a ridge 2 3/4 miles west of Hidden Valley on the west side of Johnny Lang Canyon.

Ownership: William F. and Frances M. Keys, P.O. Box 114, Joshua Tree hold at least one claim (Sulphide bismuth iron).

History: This claim is reported to have been first located by Johnny Lang, about 1900, and was then known as the Lang Copper Mine. (Oral Communication W. F. Keys, 1960). Apparently the development work was done mostly by Mr. Lang in the early 1900's. In 1925 the claim was relocated by Mr. Keys.

Geology: The mine workings explore an iron-rich body in biotite-quartz gneiss. The iron-rich body strikes north to N. 20° W. and is vertical as indicated by well defined bands of red-brown iron gossan like material and black magnetite-rich material. This body is 50 feet wide at the shaft and is at least 350 feet long. One sample which appeared typical of the magnetite-rich material was found to contain magnetite, laumontite, limonite, enstatite, and tremolite. The magnetite appeared

to be the most abundant constituent and the tremolite is altered from the enstatite. Bismuth and titanium were not detected.

Development: In a ravine at the north end and at the east side of the iron-rich body a 200-foot crosscut adit is driven along a shear zone in gneiss which strikes N. 40° to 60° E., and dips 50° W. to vertical. A second adit, 50 feet above, is driven 75 feet on a parallel shear. About 300 feet to the south, the south end of the iron-rich body is explored by means of a 100-foot vertical shaft, equipped with an old windlass and wood ladder.

Production: Undetermined. William F. Keys (oral communication, 1960) reports that the 20 tons of bismuth reportedly produced in 1904 from the Lost Horse Mine (see herein) actually was from the Sulphide bismuth mine.

References: None.

C.H.G. 1/28/60.

Unidentified Iron Prospect

Location: SW $\frac{1}{4}$ sec. 1 (proj.), T. 2 S., R. 23 E., S.B.M., Vidal quadrangle, 1950; on the west flank of the Riverside Mountains about a quarter of a mile northeast of the Gold Rice Mine.

Ownership: Undetermined.

History: Undetermined.

Geology: This deposit lies in a narrow valley along a contact between limestone on the southeast and schist on the northwest. The general strike of the rocks is N. 60° E. and the dip about 25° NW. The sheared condition of the schist and the contorted structure of the limestone underlying it suggest that the limestone and schist are in fault contact and that the valley is cut along the trace of a fault of considerable displacement. This might be the same fault that controlled mineralization at the Morning Star mine in the floor of a neighboring valley about one mile to the northeast (see herein). Hematite and barite occur in veins as much as 4 feet wide irregularly exposed through a distance of about 100 feet along the base of a limestone ridge on the southeast side of the valley. The barite appears to comprise less than 50 percent of the vein material but, locally, is intimately mixed with the iron oxides. Part of the deposit is covered by alluvium.

Development: Several shallow open cuts.

Production: Undetermined.

References: None.

R.B.S. 4/21/61

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Manganese

Arlington Black Jack Mine

Location: Secs. 18 and 19, T. 4 S., R. 20 E., S.B.M., Midland quadrangle, 1952; at the north end of the McCoy Mountains, 30 miles by road northwest of Blythe.

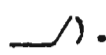
Ownership: Georges F. Kremm, 161 E. Ontario, Chicago, Illinois (1959).

History: The earliest report on manganese from this area refers to a mine called the Black Bird from which ore was shipped during the spring of 1916 (Merrill and Waring, 1917, p. 545). By 1918 the names Black Jack mine or Schellenger claims were being used for claims which probably were situated just west and northwest of the property described herein but which are on the same vein system (Bradley, and others, 1918, p. 54-56). The name Arlington appears to have been applied to one or more claims which may represent a southeastward expansion of activities on the old Black Jack claims.

The owner at that time was E. E. Schellenger, Blythe, who leased it to Robert A. Kinzie and associates in 1915. In 1917 and 1918 the property was leased by Charles F. Bradford and associates, Blythe (Tucker and Sampson, 1929, p. 492). A note on a dispute over Bradford's purchase of the property and a description of the mine was included in California Division of Mines Bull. 152 (Trask, et al., 1950, p. 177-178). The Arlington Black Jack was active during World War II at which time it was owned by Fred W. and Walter Kroger, Pomona, and Lewis I. Berck and others, Monrovia, who had leased it to Arlington Manganese Company (Tucker and Sampson, 1945, p. 149).

In 1956 the Aspen Mining Company mined ore which was concentrated in a mill at Inca Siding and Tasco Siding north of Blythe. The concentrate was sold to General Services Administration under the carlot program (Davis, 1957, p. 331, Fig. 17). From 1957 to late in 1958, under the same program, this mine was operated by California Limestone Products, Blythe. The property was then leased to Mines Contracting Company until the close of the carlot program, August 5, 1959.

Geology: The rock in the mine area is massive, sheared and jointed, granite porphyry. Numerous, north-northwest to north-northeast-trending, steeply-dipping faults cross the area. The fault zones are occupied by brecciated country rock in irregular tabular masses as much as 20 feet wide. The fissures and cavities of the breccia have been filled almost completely by oxides of manganese; principally psilomelane. The ore minerals appear to have replaced the host rock to a small extent. Traces of iron oxides are present. Mine-run ore ranges from 28 to 35 percent Mn. High-grade has brought some shipments to averages above 40 percent.

Development: Two adits bear south-southeast on a fault which strikes N. 25° W., and dips 55° SW. The lower adit is near the base of the slope. The upper adit is about 125 feet higher on the fault zone. Its portal is in the face of a cut 100 feet long, 15 to 20 feet wide, and about 50 feet high (fig. .

In 1958, a

A D.M.E.A. loan was obtained by California Limestone Products for a 900 foot crosscut and 500 feet of drifting to explore parallel fault zones to the west of the old workings. When visited (Nov. 20, 1958) the crosscut, which was started at a point about 300 feet in from the portal of the upper adit, had been driven about 800 feet west and roughly 500 feet of drifting completed on 4 faults crossed by the new exploration (fig. ___/). The new ore bodies are proving to be narrower than those in the old workings, few exceeding 5 feet in width. Though occasional streaks of high grade are found, most of the ore is a mixture of breccia and manganous oxides. When visited (Nov. 20, 1958) work was in progress extending a drift north from the new crosscut at a point about 300 feet west of the old adit. At that time the drift was about 40 feet long. Some ore has been taken from the drifts and short raises which have explored ore shoots. Except for a few stulls, no timber is used in the new workings. In the old workings, - especially at the base of the stopes, considerable timber and sheathing was used and is still largely intact owing, in part, to the dryness of the mine.

In addition to the underground exploration a considerable amount of ore is being removed from several open cuts 300 to 500 feet west of the upper adit. Activity is centered on a cut in which ore as much as 3 feet wide is exposed for about 300 feet along the strike. This fault strikes N. 15° - 30° E. and the dip ranges from 75° SE. to vertical. Two other ore-bearing faults parallel it to the northwest. One of these crosses a shallow ravine about 200 feet northwest of the above described cut. At this point a pit about 50 feet long and 18 feet deep explores a 3 foot vein. According to one of the miners, a high-grade body ^{as much as} ~~up to~~ 3 feet wide was removed from this site. The second vein, about 200 feet up the slope to the west, is exposed for 400 to 500 feet, ^{reaches a maximum width of} ~~is up to~~ 4 feet wide, but is as yet unexplored.

Production: Accurate figures are wanting on the yield of specific properties in the district. Leases have changed hands frequently. Local milling facilities at Inca Siding have received ore from other near-by mines, and, though most of the ore is milled, a considerable tonnage has been hand cobbled and sorted and high-grade shipments made directly to the purchasers. The following data are for the Arlington Black Jack and near by claims (fig. /).

Year	Ore (tons)	Reported average Percent Mn
1915	1,500	40+
1917-1918	3,000	45
1942-1945	8,500	20-42
1953-1955	-	-
1956-1958	* (probably about 35% Mn)	

*In November, 1958, 60 tons a day being sent to mill at Inca Siding. Duration of production undetermined. Idle, 1960.

References: Merrill and Waring, 1917, p. 545; Bradley and others, 1918, p. 54-56; Jones, 1920, p. 196-197, pl. 9; Tucker and Sampson, 1929, p. 492; 1945, p. 149; Hewett, et al., 1936, p. 85, map sheet 2; Jenkins, et al. 1943, p. 82-83, 154; Trask, 1950, p. 177-178; Davis, 1957, p. 331, fig. 17.

R.B.S. 11/20/58.

Arlington No. 3 (Black Metal) Claim

Location: N₂ sec. 19 (proj.), T. 4 S., R. 20 E., S.B.M., Midland quadrangle, 1952; near the north end of the McCoy Mountains.

Ownership: Georges F. Kremm, 161 E. Ontario, Chicago, Illinois. Under lease to Dan Figueroa, P.O. Box 453, Blythe (1959).

Geology: Mineralized breccia up to 3 feet wide lies along a vertical fault zone in granite porphyry, striking N. 30° E., which is poorly exposed for about 50 feet low on the west side of a shallow canyon. The principal ore mineral is psilomelane, which forms banded fissure fillings in the fault breccia. Pyrolusite is present and what might be manganite forms layers of columnar crystals in the psilomelane. Thin encrustations of calcite are common.

Development: A vertical shaft was sunk 150 feet on the fault. At the bottom of the shaft a 220-foot drift bears northeast and a 150-foot drift southwest. A ventilation shaft connects the south drift with the surface. When visited (January 1959) stoping was in progress along the drifts. Stopes had reached the surface about twenty feet on either side of the shaft collar but the relationship of these stopes to those along the drifts was not determined.

Production: When visited in 1959 the mine was yielding about 1 carload of concentrates (federal carlot program specifications) per month. The mine was idled by the termination of the carlot program (August, 1959).

References: None.

R.B.S. 1/16/59

Beal-McClellan (Black Eagle and Newport, Brum
and Newport) Property

This report is based largely on information contained in a recently published description by Engel, Gay and Rogers (1959, p. 75-76).

Location: Sec. 23, T. 5 S., R. 4 W., S.B.M., U. S. Army Corps of Engineers, Lake Elsinore quadrangle, 15', 1942; on the ridge line of the west side of Railroad Canyon.

Ownership: G. S. Beal and R. W. McClellan, Elsinore, and G. R. Smith, La Habra, hold a patent (1950) on what was formerly railroad land.

History: As early as 1900, development was reported in the area of this deposit (Aubury, 1906, p. 336), but not until the second world war was ore removed on a commercial basis.

Past reports describe under "Elsinore deposits" two showings of manganese in secs. 23 and 24, T. 5 S., R. 4 W., S.B.M., a "West group" in section 23 on the west side of Railroad Canyon, and an "East group" in section 24 on the east side of the canyon.

A comparison of these reports with field observations made in 1955 confirms the speculation by Trask (1950, p. 181) that these descriptions were based on observations at the Beal-McClellan deposit. All workings reported in section 23 (e. g. Aubury, 1906, p. 336; Bradley, 1918, p. 58; Merrill, 1919, p. 546; Tucker, 1929, p. 493; Jenkins, 1943, p. 83; Trask, 1950, p. 182-183; and Tucker, 1945, p. 150) apparently apply to the Beal-McClellan deposit.

The East group of Elsinore claims (Merrill, 1919, p. 546) was reported to be half a mile north of the West group and to extend as far as $1\frac{1}{2}$ miles east of the railroad in the bottom of Railroad Canyon (Bradley, 1918, p. 58). Merrill (1919, p. 546) indicates that this group includes three parallel veins that crop out discontinuously for a strike distance of several hundred feet, the central vein being poorly exposed but possibly 16 to 20 feet wide. A later report (Bradley, 1918, p. 58), quoted with slight modification by Trask (1950, p. 182-183), apparently applies this description of the central vein of the East group to a vein on the West group, actually the Beal-McClellan property (Engel, 1959, p. 76-77).

Geology: The deposit parallels the bedding planes of slate that here strikes N. 60° to 65° W. and dips 50° NE. The manganese-bearing zone is 3 to 4 feet wide as exposed in mine workings, and can be traced discontinuously for more than 250 yards down a steep draw eastward. The manganese impregnates a siliceous layer, apparently a somewhat recrystallized, banded chert (Trask, 1950, p. 180-182).

Just east of the ridge line, manganese minerals occupy nearly the whole width of the chert zone as exposed in mine openings. To the east and west manganese content in the zone decreases and is seen as parallel dark bands in the chert and siliceous slates. Similar dark banding occurs in the slates just northwest of the ridge line exposures.

The ore consists of black manganese oxides, both hard and soft, apparently formed by partial to complete oxidation of rhodonite. Prismatic rhodonite crystals as long as 0.2 of an inch have been reported (Trask, 1950, p. 181). Dark-brown, massive, opaline

material, sparingly present, has been tentatively identified as neotocite or bementite (Trask, 1950, p. 181). An analysis of a sample from the property showed 34.42 percent manganese, 9.52 percent silica, and 0.14 percent phosphorus (Bradley, 1918, p. 57). A dump sample contained 30.87 percent manganese (Trask, 1950, p. 182). The most complete^{ly}/oxidized, hence most valuable ore appears to be within 20 feet of the ground surface and to grade downward into unreplaced rhodonite and chert.

Development: Mining has been confined to the richest part of the exposed portion of the zone which is in the 75-foot segment just east of the ridge line. About 50 feet below the ridge line an irregular drift extends about 80 feet into the hillside. The first 40 feet of the adit has been extended upward into an irregular open stope about 25 feet high and 3 or 4 feet wide.

The 10-foot crosscuts into the hanging wall, at about 40 and 60 feet from the portal of the adit, penetrate barren slate. About 150 feet below and east of the main workings, black and white banded siliceous rock, apparently the strike extension of the chert band, has been prospected in a small cut, but no ore has been removed. About 450 feet farther east along the strike similar material carries a 2-foot width of black manganese-bearing rock where exposed in an inclined open-cut about 30 feet long, 10 to 15 feet wide, and as much as 5 feet deep.

Production: Trask (1950, p. 181) states that a production of 50 tons is listed from the claim; the 1941 production was said to be 30 tons. In 1945, the property was idle, but it was reported that several cars of ore previously shipped to Kaiser Steel Company at Fontana contained 30 to 35 percent manganese (Tucker, 1945, p. 150). No subsequent work has been done to alter the estimate that no more than 100 tons of additional oxide ore could be expected from the developed ore bed (Trask, 1950, p. 182).

References: Aubury, 1906, p. 336; Bradley, 1918, p. 58; Merrill, 1919, p. 546; Jenkins, 1943, p. 83; Tucker, 1945, p. 150; Trask, 1950, p. 181; Engel and others, 1959, p. 75-77.
R.B.S., from Engel and others.

Big Bullett Manganese Claims

Location: NW $\frac{1}{4}$ sec. 31, T. 6 S., R. 11 E., S.B.M., Mortmar quadrangle, 7.5', 1958; at the western edge of the Orocopia Mountains, 2 miles southeast of Shavers Well.

Ownership: Leland Noblitt, Brawley.

History: One, of a reported 20 claims, was being worked in 1945 (Tucker and Sampson, 1945, p. 149-150), but any previous or subsequent history was not found.

Geology: This deposit is exposed on the west slope of a ridge formed in strongly foliated quartz-muscovite schist and quartzite striking N. 30° - 40° W. and dipping 20° - 35° NE. Manganese oxides occur in lenticular masses, as much as 3 feet thick in an irregular zone of contorted quartzite ranging from 4 to 12 feet in thickness, which parallels the foliation of the country rock. The manganeseiferous zone is exposed for about 500 feet up the slope and across the crest of the ridge. It appears to be thinning to the southeast. To the northwest the deposit is covered by alluvium.

The manganese oxides apparently were deposited as compact masses of radiating pyrolusite crystals in vugs and fissures in the contorted zone. Much of the crystalline material has altered to porous, amorphous clots of wad. The manganese oxides are in a gangue of white quartz and light pink, fine-grained spessartite.

Development: The deposit has been explored by an open cut 20 feet long and 8 feet deep and several shallow prospects. It is virtually mined out.

Because of intermixed quartz and garnet, this manganese bearing material would have to be concentrated by some means in order to be of commercial grade. In most present mills it probably would yield an excessive proportion of fines because of its friable texture.

Production: In 1945 about 10 tons of manganese oxides had been mined. This material was reported to contain 30 percent manganese (Tucker and Sampson, 1945, p. 149-150). (~~Idle, (1960).~~)

References: Tucker and Sampson, 1945, p. 149-150, pl. 35.

R.B.S. 2/10/60

Black Ace (Doran) Mine

Location: SE $\frac{1}{4}$ sec. 23 (proj.), T. 3 S., R. 18 E., S.B.M., Palen Mountains quadrangle, 1952; 30 miles, by road, northeast of Desert Center at the north end of the Palen Mountains.

Ownership: L. W. Coffin, and others, 1280 Dwight Way, San Bernardino.

History: This property was formerly known as the Doran Manganese claims. W. C. Doran, the original owner, located the property in 1915 (Bradley, 1918, p. 57-58). No record was found of how long Doran held the property or the extent of development, however, by 1929 he was referred to as the former owner (Tucker and Sampson, 1929, p. 493). A description of the claims is included in California Division of Mines Bulletin 152 (Trask, 1950, p. 182) which is a modification of the earlier description by Bradley (1918, p. 57-58). During 1953 this deposit was worked under lease by Ike Kusisto.

Geology: The country rock in the mine area appears to be a sequence of layered volcanic rocks; probably the McCoy Mountains formation (Miller, 1944, p. 32). Where observed, in and about the mine, these rocks are hydro-thermally altered.

A shear zone as much as 50 feet in width strikes N. 20° E. across a northwest-trending ridge and dips about 65° SE. It is exposed in a ravine ^{on} ~~in~~ the northeast side of the ridge and several hundred feet down the southwest slope. A mixture of manganese oxides, chiefly of the psilomelane type with lesser proportions of manganite and pyrolusite, occurs as fissure and breccia fillings in the shear zone. Such manganese oxide bodies are irregular, tabular masses ranging from a fraction of an inch to 20 feet in width. Intermixed country rock is the chief impurity. Thin incrustations of calcite are common.

Development: The shear zone has been entered on 2 levels; both in the ravine ^{on} ~~in~~ the northeast slope of the ridge. The lower level is an ^{drift} ~~adit~~ driven southeast 150 feet on an ore body as much as 6 feet wide. A raise, fitted with a loading chute, was driven to the surface from a point about 115 feet from the portal. A 12-foot crosscut turns 65° to the right at a point 85 feet from the portal. It turns left into a 30 foot drift roughly parallel to the main adit but no ore is exposed. The upper workings are about 100 feet farther up the ravine. They consist of 2 short drift adits, one on the footwall and one along the hanging wall of

the shear zone and parallel with an open cut. The open cut is about 75 feet long and 20 feet high from which an adit extends another 50 feet southwest. An orebody 20 feet wide is exposed in the face of the cut and in the adit. The adit along the hanging wall side of the shear zone extends about 20 feet southwest. A 2-foot-wide vein has been stoped to a height of about 25 feet along most of its length. The footwall adit runs southwest about 40 feet along a narrow shear. At its end a narrow, 50-foot raise follows an ore body about 13 inches wide.

The portals of all the adits except that in the open cut are timbered but otherwise little timber was used.

The ore from the upper workings was dumped into the ravine and channeled into the raise coming up from the loading chute in the lower adit. From the portal of the lower adit ore was lowered down some 400 feet of inclined railway to a loading bunker in the canyon below.

Production: The only report of yield is a small tonnage of ore, containing 31 percent manganese, in 1953 (Ike Kusisto, personal communication). When visited (February, 1959) the mine was idle, however, the property appeared to have been only recently idled. Judging from the extent of the workings a considerable total tonnage must have been shipped; probably during the recent government stockpiling programs.

References: Bradley, 1918, p. 57-58; Tucker and Sampson, 1929, p. 493; Miller, 1944, p. 32; Trask, 1950, p. 176-185.

R.B.S. 2/5/59

Black Bird Mine

See Arlington Black Jack Mine.

Black Eagle and Newport Claims

See Beal-McClellan Property.

Black Jack Mine

See Arlington Black Jack Mine.

Black Rock Claim

Location: W¹/₂ sec. 22, T. 3 S., R. 23 E., S.B.M., Big Maria Mountains quadrangle; on the south slope of Quien Sabe Point, 25 miles north of Blythe.

Ownership: Harley K. West, 2362, 246th St., Lomita, California and Ruth Richardson, Box 185, Othello, Washington (1958).

History: A recent claim (1958).

Geology: The Black Rock claim is underlain by mica schist cut by granite pegmatite dikes and at least one shear zone. The sheared and mineralized rocks are exposed for about 50 feet across the crest of a ridge east of the camp site. They occur at the junction of the shear zone and a pegmatite dike. Oxides of manganese and iron are associated with barite and quartz in fissure fillings in a zone as much as 3 feet wide including both schist and pegmatite.

Development: Little more than discovery and assessment work, in the form of shallow pits and trenches, had been done at the time of the writer's visit (December 1958).

Production: None.

References: None.

R.B.S. 12/17/58.

Black Strike (Grosse Claims) Claim

Location: N $\frac{1}{2}$ sec. 19, (proj.), T 4 S., R. 20 E., S.B.M., Midland quadrangle, 1952; at the north end of the McCoy Mountains.

Ownership: Georges F. Krenn, 161 E. Ontario, Chicago, Illinois. Leased to Dan Figueroa, P.O. Box 453, Blythe (January 1959).

History: The Black Strike appears to coincide with part of a former group of claims known as the Grosse Manganese claims (Bradley, and others, 1918, p. 58; Tucker and Sampson, 1929, p. 493) from which ore was being shipped during the 1920's.

Geology: Two converging faults, one striking N. 20° W. and dipping 70° SW. and the other striking N. 10° E. and dipping 75° NW., are exposed on the north side of a shallow canyon. Both faults include irregular bodies of brecciated and mineralized granite porphyry country rock as much as 6 feet wide. Manganese ore minerals, chiefly psilomelane but with minor amounts of pyrolusite and manganite, were deposited in the fractures and openings of the fault breccia. Though not well exposed on the surface, this deposit could probably be traced northward to the Black Jack and proven to be part of the same deposit.

Development: Two adits, one driven 200 feet N. 20° W. on one fault and the other, 75 to 100 feet up the slope to the northwest, driven 80 to 100 feet N. 10° E. of the other fault, were under development in January, 1959. Along both adits the more favorable concentrations of ore are being stoped, and have been stoped to the surface at several points.

The older workings explored outcrops in the canyon bottom immediately to the south. Seasonal flooding is filling the old shafts and stopes with debris and would hinder their reopening.

Production: At least 2 carloads of manganese ore shipped from the old workings during the year 1918 (Bradley and others, 1918, p. 58). The current yield is 1 carload per month (lessee, personal communication, January 1959).

References: Bradley and others, 1918, p. 58; Tucker and Sampson, 1929, p. 493.

R.B.S. 1/16/59.

Brum and Newport Claims

See Beal-McClellan Property.

Dioxide Manganese Group

See: Langdon Mine.

Elsinore Manganese Deposits

See: Beal-McClellan Property.

George (Red Rock) Claims

Location: E $\frac{1}{2}$ sec. 32 (proj.) and W $\frac{1}{2}$ sec. 33 (proj.), T. 4 S., R. 20 E., S.B.M., Midland quadrangle, 1952; on the east slope of the McCoy Mountains, half a mile northeast of the St. John Mine, about 9 miles by road west of Inca Siding.

Ownership: James F. and Bertha C. George, 3165 S. Spring St., Blythe, hold 8 claims - Bertha 1-5 and G & G 1-3 (1958).

History: In 1918 this property was described under the name Red Rock mine (Trask and others, 1950, p. 179-180). It was owned at that time by E. E. Schellenger of Blythe and operated under lease by Dee Clark of Blythe.

Geology: The mine area is underlain by sheared, granite porphyry, cut by at least 6 closely-spaced, north- to north-northwest-trending, vertical- to steeply northeast-dipping faults. The faults are poorly exposed through horizontal distances of 50 to $\overline{100}$ feet across a low, narrow, east-trending spur. They comprise zones ranging in width from 1 to 4 feet filled with brecciated country rock, manganese oxides, barite, and calcite. The mangiferous fissure and void fillings range from 0 to 1 foot in width. The manganese oxides, barite, and calcite commonly occur as discreet, alternating layers, about one inch in thickness, suggestive of sequential deposition. Recurrent movement on the faults has brecciated the mangiferous material along narrow, irregular zones within the larger fault zones and the resulting mixture of rock and mineral matter is cemented by calcite.

Careful mining and sorting would yield small quantities of high-grade ore but the bulk of the material would demand beneficiation. Concentration by gravity methods might prove difficult because of the abundance of barite in the deposit. The specific gravity of barite ranges from 4.3 to 4.6; that of psilomelane, the type of ore here involved, is 3.3 to 4.7.

Development: Five fault zones have been exposed in 2 discontinuous trenches as much as 12 feet deep and 150 feet long and 3 open cuts as much as 20 feet deep at the face. The open cuts are in the south flank of the spur and the trenches extend northward across its crest. The 2 trenches and 3 open cuts are evenly spaced through a horizontal distance of about 300 feet.

Production: By October, 1918 one rail car of ore had been shipped (Trask and others, 1950, p. 180). No other record was found.

References: Trask and others, 1950, p. 179-180.

R.B.S. 1/14/59.

Giant Chief Claim

See: Yellow Stone Claim.

Grosse Claims

See Black Strike Claim.

Langdon Mine

Location: $W\frac{1}{2}$ sec. 17, T. 4 S., R. 21 E., S.B.M.,
Midland quadrangle, 1952; about $3\frac{1}{2}$ miles by road north-
west of Inca siding.

Ownership: California Limestone Products, Blythe,
(January, 1959).

History: In 1918 the Langdon mine was owned by
H. N. Mabery, Los Angeles, and Chas. E. Brown, Mecca,
who were shipping 4 tons of ore daily. (Bradley, and
others, 1918, p. 59). During World War I, 1,500 tons
of ore were shipped from the Langdon and claims nearby
but from the end of the war until as late as 1943 the
property remained idle (Trask, and others, 1943, p. 83,
156). During 1944 this mine was under lease to J.
Figueroa, who made several small shipments of ore to
Metal Reserve Company's stockpile at Parker, Arizona.
The ore was reported to carry 35 to 40 percent manganese
and 8 percent silica. In 1945 the claims were again
idle (Tucker and Sampson, 1945, p. 150). From 1951 to
1958 the present owner worked the Langdon. When visited
in January of 1959 the mine was under lease to Virgel
Denning who was shipping ore to the federal government
through the "carlot" program (terminated August 5, 1959).

Geology: A fault zone trends about N. 30° W. along the eastern base of a group of low hills. The zone includes a large volume of brecciated, dense, gray-to pink limestone which carries oxides of manganese as fissure and cavity fillings. The ore is chiefly of the hard, psilomelane type. The fault appears to dip northeast and is as much as 100 feet wide, being more of a zone than a discrete fracture.

Most of the ore bodies occur as veins one inch or less wide. Some larger ore bodies have been encountered but larger masses tend to be full of voids surrounded by coalescing, botryoidal surfaces. Thin crusts of calcite are common.

Development: Prior to 1951 this deposit was developed by means of adits, drifts, and shallow shafts in an effort to discover local concentrations of ore. Mining under the current ownership has been largely by open pit, the object being to remove large quantities of milling-grade ore. In the process, the former workings are being destroyed. When visited (January, 1959) the mineralized zone had been exposed for about 1,000 feet by a series of joined pits as much as 100 feet wide and a maximum of 60 feet deep. Ore is trucked to a mill at Inca siding.

Production: About four carloads of concentrates (40.00+ percent Mn.; 15 percent max. -20 mesh) per month were being shipped when the property was visited in 1959.

References: Bradley, Walter W., and others, 1918, p. 59; Tucker, 1921, p. 328-329; Trask, and others, 1943, p. 82-83, 154; Tucker and Sampson, 1945, p. 150.
R.B.S. 1/13/59.

Lucky Boy Mine

Location: NW $\frac{1}{4}$, sec. 24 (proj.), T. 3 S., R. 20 E., S.B.M., Midland quadrangle, 1952; 3 $\frac{1}{2}$ miles northwest of Midland, at the south end of a low, elongate ridge.

Ownership: Undetermined.

History: This claim is reported to have been located in 1942 by Herman Kiel under the name Paddy Faulkner Claim (Wilson, 1943, p. 185). Details of its subsequent history were not found but it is apparent that a few tons of ore have been removed from the property.

Geology: The mine area is underlain by schist which strikes N. 60° - 80° E., dips 55° - 65° NW., and includes two thin limestone units about 100 feet apart. A vertical fault strikes N. 30° W. across the claim. There is a right-lateral separation of about 18 feet where this fault cuts the limestone units. The limestone is strongly sheared and further deformed by drag near the fault. Mineralizing solutions appear to have followed the fault, and to have selectively replaced the sheared limestone by oxides of manganese. Manganese mineralization is confined to the fault zone and the truncated limestone units on its southwest side. The ore is a porous mixture of psilomelane, pyrolusite, sericite, and calcite. The ore-bearing limestone units are 10 and 15 feet wide and crop out for about 100 feet down the slope between the trace of the fault and the alluvium to the southwest. Thin stringers of ore are irregularly exposed on weathered limestone surfaces.

Production: Undetermined.

Development: A 50-foot shaft inclined 50° NW. was sunk on an ore shoot as much as 10 feet wide at the junction of one of the limestone units and the fault. When visited (Feb. 1959) a head frame was intact at the collar. The down-slope limestone outcrops ^{was} explored by shallow prospect pits and one shallow trench was dug in the fault zone about midway between the limestone units. All of these prospects expose some ^{manganese} Mn oxides but no presently mineable ore bodies.

References: Wilson, 1943, p. 185.

R.B.S. 2/3/59

Mabery and Brown Deposit

See: Langdon Mine.

(Social Manganese mine)

Manganese Canyon Group

Location: SW $\frac{1}{4}$ sec. 13, and NE $\frac{1}{4}$ sec. 24, T. 4 S., R. 19 E., S.B.M., Midland, quadrangle, 1952; at the north end of the McCoy Mountains.

Ownership: Dan Figueroa and Sons, P.O. Box 453, Blythe.

History: Hudson (1950, p. 180) gave a brief description of what appears to have been early (1918) development on one of the original claims (Social Manganese mine) of this group. The present owner was active on this property in 1958.

Geology: Fault planes occupied by masses of mineralized breccia as much as 15 feet wide cut sheared and jointed granite porphyry. The breccia zones are exposed on the sides of a steep canyon and on the ridges in the rugged area immediately west of the Black Jack claims (see herein) and are a part of the same mineralized fault system. The faults form a large-scale boxwork of northeast and northwest-trending breaks which are vertical or dip steeply northwest or southwest.

The ore is of the psilomelane type with some pyrolusite and interlayered crystalline oxides which may be manganite. The oxides comprise fissure and void fillings, ranging from thin coatings to irregular masses as much as a foot thick and several tens of feet in lateral extent in the fault breccia. The explored fault zones are in a group exposed on a ridge in the angle formed where the canyon turns south. Here, four fault zones are exposed about 200 feet above the canyon floor. The widest of these is as much as 15 feet wide. It strikes obliquely down the ridge N. 15° W., and dips 70° SW. and is joined, near the crest of the ridge and on the north slope, by the other 3 narrower faults which strike N. 25° E., N. 40° E. and N. 25° E. The lowest of these 3 faults dips 55° NW.; the other 2 are vertical.

Development: The widest fault is explored by an open-cut, as much as 40 feet deep, on the north slope near the crest of the ridge. The other 3 faults are opened on the crest of the ridge and about 50 feet across the west slope by shallow open-cuts. Half way down the north slope the westernmost of the narrower faults is followed south about 140 feet by an adit in which the ore is as much as 5 feet wide. A 190-foot adit was driven S. 75° E. into the west slope about 100 feet below the ridge-crest workings in an apparent attempt to crosscut the mineralized faults. The adit reached a 12-foot-wide ore body. About 15 feet from the portal a raise was driven to the surface. An ore chute was installed and ore from the ridge above allowed to gravitate down the slope into the open raise. In addition, the workings on the ridge were served by an aerial tramway down the north slope.

The ridge, which forms the north and west sides of the canyon, has been extensively prospected and trenched by former operators and one cut, on the north side of the canyon, appears to have been mined by the current owner. It is about 50 feet long, and 15 feet deep on an ore body as much as 6 feet wide in a fault striking N. 20° W., and dipping 70° SW.

Production: According to the owner, in 1958, 4
carloads of ^(grade unspecified) ore were shipped from this mine on the
government carlot program; the ore was milled at Inca
Siding. No earlier figures were given.

References: Hudson, F. S., 1950, p. 180.

R.B.S. 1/15/59

Paddy Faulkner Claim

See Lucky Boy Mine.

Red Rock Mine

See: George Claims.

Social Manganese Mine

See: Manganese Canyon Group.

Yellow Stone (Giant Chief) Claim

Location: NW $\frac{1}{4}$ sec. 24 (proj.), T. 3 S., R. 20 E., S.B.M., Midland quadrangle, 1952; on a low outcrop of limestone and schist about 2,000 feet southeast of the Lucky Boy mine and about 3 $\frac{1}{2}$ miles northwest of Midland.

Ownership: Ellen Wendling, Box 344, Blythe, California (January 1959).

History: The Yellow Stone is a relocation of the former disputed Giant Chief claim described by Wilson in 1943 (Trask, 1950, p. 183).

Geology: A complex of limestone and schist units appear to be faulted along the southwest side of a low, limestone knoll which rises a few feet above the gravel-covered surface of a pediment. The planar structure of the rocks strikes N. 80° E., and dips 40° NW. The limestone unit exposed on the knoll contains numerous thin veins of manganese oxides. The principal ore mass is on the north side of the knoll. It thus far visible in the workings appears to consist of a tabular body of psilomelane-type oxides as much as a foot wide which lies in a shear zone parallel to the schistosity and roughly coincident with a limestone unit, ~~just north of the limestone knoll.~~

No fault is exposed in the workings but, as suggested, one might lie just southwest of the knoll. If such a fault is a controlling factor, as is true at the nearby Lucky Boy mine, more extensive ore bodies may yet be found along it.

Development: A single open pit about 15 feet deep was dug on the mineralized shear zone north of the limestone knoll. The ore is exposed in its west wall.

Production: Undetermined.

References: Wilson, 1943, see Trask, 1950, p. 183.

R.B.S. 2/3/59.

Geology: A mass of dark black hornblende-proxene-biotite schist occurs in foliated quartz biotite gneiss and biotite schist (Chuckwalla complex). The hornblende-biotite schist mass crops out along both sides of the canyon and is about 900 feet in diameter with most of the body lying on the east side of the canyon. Locally the body is altered to hydrobiotite and vermiculite (Proctor, 1958, p. 45). According to Proctor (1958, p. 46) there are an estimated 50,000 tons of altered rock.

A few nodular submetallic masses consisting of a dark gray mineral, surrounded by biotite, occur in thin pegmatite dikes which thoroughly cross-cut the mass. This mineral apparently is euxenite (Proctor, 1958, p. 46).

Development: Several steep faces along the canyon have been blasted down, but no regular quarry has been opened. A grizzly and truck-loading bunker and crusher foundations remain on the property.

Production: Probably about 100 tons to perhaps a few hundred tons in 1940.

References: Proctor, 1958, p. 45-46.

C.H.G. 5/20/61.

Micas

Johnson Deposit

Location: SW $\frac{1}{4}$ sec. 9, T. 3 S., R. 6 E., S.B.M.,
Thousand Palms quadrangle, 1958; south margin of the
Little San Bernardino Mountains about 8 miles south-
east of Desert Hot Springs, in the first canyon east
of East Wide Canyon.

Ownership: Southern Pacific Land Company, 65 Market
Street, San Francisco 5.

History: The deposit was worked briefly in 1940 by
a Mr. Johnson. A few tons of biotite and vermiculite
were mined, crushed at the site, and hauled to San
Bernardino where the material was expanded in a rotary
kiln. About 1958, the property was leased by Christopher
Mines, Inc., who prospected the property for vermi-
culite and uranium. At that time the deposit was
examined by the California Zonolite Company, but was
not put into operation because of estimated small
reserves of high-grade vermiculite.

Ida V. Mine

Location: Near the center of sec. 10, T. 7 S., R. 2 E., S.B.M., Hemet quadrangle, 1957; low on the east slope of Coahuila Mountain.

Ownership: Undetermined, (1958).

History: The original date of location was not determined but the Ida V. was relocated late in 1954 by Charles I. Rossman and others. The mine probably was operated late in 1954 and during 1955.

Geology: On the Ida V property a dike is exposed which carried an unusual concentration of muscovite mica. It strikes N. 40° W. and dips 25° NE., is 10 to 15 feet wide, and is poorly exposed for about 500 feet up a brush-covered ridge. The dike consists of quartz, feldspar, muscovite and biotite mica, black tourmaline, and garnet. The dike shows no consistent zoning but local concentrations of mica, garnet, and black tourmaline, are present. The relative proportions of the constituents were not determined because of limited exposure of the pegmatite body and the unsafe condition of the mine. Blocks of brittle, herring-boned muscovite, 4 inches across the cleaved face and 6 inches thick, are exposed near the portal of the adit.

Development: A single drift adit about 40 feet long was driven in the process of removing a concentration of mica crystals. When visited (June, 1958) the adit was partially caved and the road, leading to the property from Pomroy's ranch, was in bad repair.

Production: According to T. C. Pomroy, a local resident, the mica ran out after a small tonnage had been shipped (presumably during the 1954-1955 period), to a Los Angeles paint manufacturer to be ground and used in their products (T. C. Pomroy, personal communication).

References: None.

R.B.S. 6/27/58.

Lucky Day Deposit

See: Pine Knot deposit.

Lucky Lay Deposit

See: Pine Knot deposit.

Pine Knot (Lucky Day, Lucky Lay) deposit

Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 6, T. 2 S., R. 7 E., S.B.M., Joshua Tree quadrangle, 1955; Joshua Tree National Monument, 7 $\frac{1}{2}$ miles south of Joshua Tree on the east side of Lower Covington Flat at its south end, about 200 feet above the valley.

Ownership: A. M. and M. C. Roberts, E. L. and Lois Boren (1942). Undetermined (1960).

History: The Pine knot claim was located at some unknown date prior to the establishment of Joshua Tree National Monument in 1936. No recent work was observed in January 1960.

Geology: Medium- to coarse-grained, banded, quartz monzonite gneiss contains pods of impure biotite. The biotite occurs as black to grayish green, small thin plates. The mica pods range from 2 inches to 3 feet in thickness and are as much as 6 feet long where exposed in pits. Some of the pods strike N. 65° W. and dip 45° NE.; others strike N. 70° E. and dip 40° NW.

Development: Mica pods have been explored by one pit about 10 feet in diameter and 6 feet deep, and by 4 small cuts, each about 6 feet deep. An old winch line with track remains on the property and apparently was intended to move material to a truck loading site in the valley below.

Production: Undetermined.

References: None.

C.H.G. 1/27/60.

Mineral Paint

Lord Deposit

Clay?

Location: Undetermined, probably was in the area of NW $\frac{1}{4}$ sec. 14, NE $\frac{1}{4}$ sec. 15, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, between Main Street and Hagador Canyons.

Ownership: Undetermined. May be part of several claims held by Josephine Middleworth, 847 West 9th Street, Corona, or on patented ranch land owned by W. H. Redding, 1008 South Pacific Avenue, San Pedro (1957). See Middlesworth Clay deposit herein.

History: Aubury (1906, p. 339) reported a bed of fine-grained, light-colored, yellow ochre 8 feet wide in a deposit of fire clay. In 1905 George W. Lord, Corona, was the operator. Apparently long idle.

Geology: Paleocene Silverado Formation clays crop out in this area.

Development: Numerous prospect pits and open-cuts and several caved adits.

Production: Undetermined.

References: Aubury, 1906, p. 339; Merrill, 1917 [1919], p. 579; Symons 1930, p. 156; Gray, 1961, p. 117.
C.H.G. 3/6/61.

National Paint and Color Company Deposit

Location: Undetermined, probably was in the NW $\frac{1}{4}$ sec. 14, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, northwest side of Main Street Canyon.

Ownership: Undetermined.

History: According to Aubury (1906, p. 339). the National Paint and Color Company produced about 20 colors of natural pigments (ochre, red oxide, vermillion red, grays, etc.) in Corona in 1905. Long idle.

Geology: The National Paint and Color Company is reported (Aubury, 1906, p. 339) to have held extensive clay deposits near Corona; one tract of 20 acres contained a 5-foot bed of chrs stated to be of a very choice quality. This bed of ochre was not observed in 1957, but clays of the Paleocene Silverado Formation crop out in the area.

Development: Undetermined.

Production: Undetermined.

References: Aubury, 1906, p. 339; Symons, 1930, p. 156; Gray 1961, p. 117.
C.H.G. 3/6/61.

Paint Mine

Location: Undetermined, probably was in the area of the NW $\frac{1}{4}$ sec. 14, NE $\frac{1}{4}$ sec. 15, T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona, between Main Street and Hagador Canyons.

Ownership: Undertermined.

History: This property was developed by G. W. Lord, Corona, before 1905 and in 1905 was owned by the Corona Pressed Brick and Terra Cotta Company. The deposit was reported to be about 500 yards northwest of the Lord deposit, described herein. Long idle.

Geology: Paleocene Silverado Formation clays crop out in this area.

Development: Undetermined.

Production: Undetermined.

References: Aubury, 1906, p. 339; Symons, 1930, p. 156; Gray, 1961, p. 117.

C.H.G. 3/6/61.

4 L's (Dorothy Ann) Prospect

Location: The extreme southwest corner of sec. 34, T. 4 S., R. 2 E., S.B.M., Lake Fulmor quadrangle, 7.5', 1956; near the intersection of San Jacinto Ridge Truck Trail and Stone Creek, about 8 miles, by road, northwest of Idyllwild.

Ownership: C. H. Brooks (1958).

History: Bob Appleton of Pine Cove is reported to have stated that this property was worked for molybdenum, probably during the first World War (personal communication, Norman Sanders, 1961).

Geology: The mine area is underlain by granitic rock, probably Mesozoic in age, that forms much of the San Jacinto Mountains. A thin quartz vein was noted by Mr. Sanders in the upper workings.

Development: The only development observed in July, 1958 was a 40-foot adit driven N. 75°W. in sheared and apparently barren granitic rock. Norman Sanders reports that there is, in addition, a 60-foot adit driven N. 50° W. from which extend two, 60-foot drifts bearing N. 16° E. and a 20-foot raise to the surface. These are a short distance up the slope from the truck trail and the 40-foot adit and are obscured by brush.

Production: The small extent of the workings and the observed and reported narrowness of the veins, suggest the yield of this mine, if any, was probably small.

References: None.

R.B.S. 7/22/58.

Peat

Burro Flats Deposit

Location: SE $\frac{1}{4}$ sec. 14, T. 2 S., R. 1 E., S.B.M., Cabazon quadrangle, 7 $\frac{1}{2}$ ', 1956; south edge of Burro Flats, at the head of Potrero Creek, about 4 miles north-northeast of Banning.

Ownership: U. S. Government; leased to the Morongo Corporation with the permission of the Morongo Indian Tribe.

History: Development was started by the present lessee in the fall of 1956.

Geology: Ground water, dammed in a sagpond on a fault of the San Andreas fault system has resulted in the development of a peat bog. The peat is composed mainly of the compacted and partly decomposed remains of reeds, rushes, and sedges (grasses). The deposit underlies an irregular area of about 21 acres and ranges from 0-16 feet in thickness. It is wedge shaped in profile being thickest along the south margin adjacent to the fault. The peat thins to the north where it becomes interbedded with clay, silt, and gravel.

Development: The bog has been partly drained to facilitate mining. The exposed surface of the peat is loosened with a harrow and allowed to dry, in place, to about 25 percent water by weight. The peat is loaded into trucks with a power shovel, ground in a plant adjacent to the bog, and trucked to a bagging plant near Banning.

Production: Since 1956 production has been irregular. Current output is somewhat seasonal because the principal market is golf clubs who use the peat as a conditioning material in seeding and maintaining greens and fairways. The present (November, 1960) yield is about 1,000 yards per month.

Grinding is done according to specifications of the users. A broader market is anticipated by the operators in sale of this product to home gardeners.

References: Saul, 1960, p. 8-9.

R.B.S.

Perlite

Great Western Exploration Company Perlite Prospect (Deposit)

Location: Secs. 26 and 27, T. 8 N., R. 18 E. (proj.), S.B.M., Chuckwalla Spring Quadrangle, 15', 1953, on the south slope of the Little Chuckwalla Mountains about 10 miles westerly from Wiley's Well.

Ownership: Eight claims owned by Great Western Exploration Co. Inc., Room 908, 408 S. Spring Street, Los Angeles.

History: The perlite deposits on these claims are said to have been discovered in 1947-48, by George B. Gibford and associates, but were never worked until 1961 when a small plant was erected to obtain perlite for testing purposes. The property was idle in November 1961.

error
T85 not T8N

Geology: The perlite occurs in lens like bodies associated with flows of rhyolite and discontinuous layers of pumiceous tuff breccia. These flows of rhyolite and perlite rest unconformably upon andesite and are overlain unconformably by flows of basalt. In the vicinity of the perlite claims, the sequence of volcanic rocks dips in a southeasterly direction and has a strike that ranges from northeasterly to almost north. There are three main bodies of perlite in the mapped area (pl. ___/). The largest body is approximately 4,000 ft. in length and ranges in thickness from 50 to 130 ft. The perlite in this body is pumiceous, light gray in color, and expands satisfactorily. The screening plant is located near the southern end of the medium sized body of perlite which measures about 1,200 ft. in length, and ranges in thickness from a few feet to 80 ft. The perlite in this lens is the dense, medium gray onion skin variety and it too expands satisfactorily. Near the southern end of the mapped area is the third body of perlite which measures at least 1,000 ft. in length and is probably no more than a few tens of feet in thickness. This perlite too is pumiceous and is similar in all respects to the perlite in the large body. It occurs between two flows of perlitic rhyolite, but probably does not constitute a large source of perlite since one would need to mine the perlite by

underground methods after stripping the surface. Several small faults in the area dislocate the perlite bodies, however, none of the faults is of sufficient magnitude to materially effect the mining of the perlite.

Comments: Considerable testing has been done on the various grades of perlite (pumiceous perlite and dense onion skin perlite) and all tests indicate that the perlite will expand satisfactorily and may be used as aggregate for acoustical insulating plasters or in the manufacture of wall board.

Development: Development consists principally of shallow trenching in several areas where perlite crops out, and the removal of debris from other areas where the perlite was not exposed.

The deposit contains substantial reserves.

C.W.C. 3/1/62

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Petroleum

Petroleum

Exploration for oil has been carried on in Riverside County for more than 40 years. The area of chief interest, and the only one in which any success has been achieved is on the northeast margin of the Santa Ana Mountains in the region of Prado Dam (Plate ___/). Here, sedimentary rocks of Miocene and Pliocene age are folded and faulted between and adjacent to the northwest-trending Elsinore Fault zone and the Chino Fault.

Published reports show commercial petroleum production in Riverside County only during the years 1960 and 1961 for which period production was 2,536 bbl. and 4,786 bbl. respectively.

Oil encountered in the Prado Dam area appears to be on the extreme southeast periphery of the Mahala oil field which lies mostly in adjoining parts of San Bernardino County. The oil has accumulated in a faulted homocline. It is produced from three sands: the Abacherli, which is 50 feet in average thickness and reached at average depths of 2,500 feet; the Lower Michelin, which is 200 feet in average thickness and reached at average depths of 1,500 feet; and the Upper Michelin which is 250 feet in average thickness and reached at average depths of 1,250 feet. All three sands are in the Upper Miocene Puente Formation. The Abacherli sand yields 24-gravity oil. Both Michelin sands yield oil of 27 gravity.

The Mahala oil field has been explored through a total of 46 wells. A total of 19 of the wells were completed, four of them in Riverside County. Two of the four Riverside County wells yielded commercial production. The peak year for the whole field was 1957 during which 161,720 bbl. of oil were produced.

Table ___/ is a list of all wells reasonably well documented or known by the writer to have been drilled in search of oil or stratigraphic information in Riverside County. Those lying in the Prado Dam area are plotted on Plate ___/. Those in the remaining part of the County are shown on Plate ___/.

part of the County are shown on Plate /

T.	R.	Sec.	Owner and Well Name	Date started	Date abandoned	Total Depth	Remarks
23	7W	35	Tannehill, L.B.; No. 1	2-20	1925	580	Elevation 505'
23	6W	15	Kosanke, J.W.; No. 1	3-36	1937	396	Show of oil and gas reported.
23	5W	31	Arl Oil Co.; No. 1	9-22	pre-1925	1125?	
23	3W	14	Cheney Oil Lease Syn.; No. 1	3-23	1926	1950	
23	2W	16	Midway Oil Syn. (Beaumont Midway Oil Co.); No. 1	3-22	1926(?)	5353	
23	2W	35	Alberta Oil Co.; No. 1		1933	3180	
23	2W	35	Smith, S.V.; Haskell 1	12-52	1953	1352	Quaternary
23	1W	12	Riverside County Oil Co.; No. 1	11-20	pre-1925	2235	
23	3E	25	Painted Hills Oil Assn.; No. 1	5-20	1925	1400	
23	4E	11	Amundson, Floyd; No. 1	6-26	1926	212	
23	4E	14	Century Oil Assn.; No. 1	4-21	pre-1925	500	
23	4E	30	Painted Hills Oil Assn., No. 2	11-21	pre-1925	400	
23	4E	33	Wallenberg; Daisy 1	1918			
23	6W	19	Prosper, D. Smith: "Smith & Scott" #2	10-24-57	11-1-57	651	Dry hole, bottomed in granite base of fresh water sands 90' elevation at collar 680'.
23	6W	20	Prosper D. Smith: "Smith & Scott" #1	5-12-57	11-1-57	411	Dry hole, bottomed in granite base of fresh water sands 80' elev. at collar 690'.
23	6W	30	Southern California Petroleum Corp. "Taber Estate" Core Hole 1	12-11-44	12-30-44	210	Dry hole, bottomed in granite sand and gravel to granite contact at 192'.
3S	7W	2	Corona Oil Co.; No. 1	11-20	1921	400	
3S	7W	8	Cherrydale Oil Co.; Cherrydale 1		1952	2478	Miocene

3S	7W	9	Airways Petroleum Corp.; Santa Anaheim 1	9-49	Susp.1950	2830	
3S	7W	26	Neuvo Oil Co.; No. 1				
3S	7W	33	Ciroco Oil Co.; Ciroco- Wright 1	11-51	1952	1520	1954 deepened to 4027. Frank Pettyridge
3S	6W	25	Easton-Monell; No. 1		1933	3090	
3S	5W	6	Arl Oil Co.; No. 1	11-21	pre-1925		Granite
3S	4W	12	Mathews, Roland & Dalziel; No. 1	10-22	1927	2610	Granite ?
3S	2W	15	Moreno Oil Co.; No. 1	10-20	1925	1700	
3S	2W	26	Nuevo Oil Co.; No. 1	12-20	1928	2225	
3S	1W	1	Beck, Frank; No. 1	1-31		450	Converted to water well.
3S	1W	12	Beaumont Expl. Co.; John Drew 1	6-53	1953	2215	Pliocene
3S	1W	15	Rippetto, L. W. (Beaumont Crude Oil Co.); No. 1	3-21	pre-1925	1925	
3S	2E	5	Clark, L. R.; No. 5		1928	1960	
3S	3E	9	Cabazon Oil Co. (Cabazon Central Oil Co.); No. 1	8-22	pre-1925	600	
3S	4E 4 or 5		Western Dev. Corp. (Ban- ning Oil Co.); No. 1	4-21	1930	975	
3S	7W	3	Clifford A. Robinett "Pinkerton" #1	8-31-54	9-8-54	1068	Dry hole, Bottomed in shale.
3S	7W	14	John L. Smith "Sullivan" #1	12-9-57	12-12-57	352	Dry hole, Bottomed in granite. Elev. 600' above (8.1) sea
3S	7W	15	J.B. Nelson "Lillibridge" #1	11-17-56	2-3-57	1360	Dry hole, bottomed in Middle Puente; cemented to 750' and converted to water well 6/56; elect. log- 500'-1346' elevation 525' above sea lev
3S	7W	22	J.B. Nelson "Lillibridge- Government #1	9-3-58	9-17-58	1711	Bottomed in Lower Miocene; dr hole; elect. log. 285'-1200' elevation 535 above sea level
3S	7W	22	J.B. Nelson "U.S." #1	1-30-58	5-6-58	1829	Dry hole, bottomed in volcanic rocks of possible Miocene ag elect. log 155'-1825' elev. 450' above sea level.

			"Prado Dam" #1				hard ss-- no oil showings --no water; elev. 6'
3S	7W	7	Julian S. Gould, "T.B.G." #1	6-14-	10-10-62	1880	Dry hole; bottomed shale upper "Michelin" zone; a few traces of oil and gas; elev. 520'.
3S	7W	7	Julian S. Gould "T.P. Gov." #1	11-1-59	Idle	1388	Light showings of oil at several depths; operations suspended; elev. 619'.
3S	7W	18	C.D. Howe "Cree" #1	11-14-57	12-3-57	3075	Dry hole; top of Mohnian at 2505'; elev. 600'.
3S	7W	18	C.D. Howe "Prado Oil Co." #7	8-1-58	8-7-58	2900	Dry hole, showed traces of oil top U. Mohnian Div. C, 2360; Top "Michelin" Zone, 2620; elev. 509'.
3S	7W	18	C.D. Howe "Wilcox" #1	5-18-57	6-29-57	4490	Small yield of oil and gas, no production; bottomed in Upper Miocene; Mohnian 2705-3595; Delmontian 1980-2700; elev. 790'.
3S	7W	18	Shaffer Rentals, Inc. "Hudson" #2	3-29-60	4-9-60 Idle	3909	Appears to have pumped oil; bottomed in ss. and sh. elev. 920'
3S	7W	18	Atlantic Oil Co. "Atlantic Aros" #1	4-14-57	5-9-57 Idle	3853	A small producer, appears to have bottomed in or just below oil sand; elev. 850'
3S	7W	18	Prado Basin Oil Co. "Gov. T N.P.-C" #1	10-4-59	10-25-59	4609	Dry hole; bottomed in Lower Mohnian; top of Michelin 3225, top of Yorba sh. 3550, top of Yorba sd. 4460; elev. 768.
3S	7W	17	Alpoil Company "Gov. Tmp-C" #1	11-2-60	11-13-60	3569	A small yield; appears to have bottomed in sediments; top of Delmontian 1560? 1680? top of U. Mohnian 2220 Div. top of Yorba sh. 2660 Div. D, top of Yorba sd. 3345 Div. D elev. 475.

33 7W 17 Alpoil Company 7-16-60 7-29-60 3626 Dry hole; bottomed in Puente
"Gov. T.M.P. - D" #1 fm.; top of Belmontian 1630
top of U. Mohnian 2260-
Div. C, top of Yorba Shale
2390 - Div. D, top of Yorba
sh. 3500-Div. D.; elev. 477'

33 7W 20 Macrate Oil Co. G-G1 2-16-57 3-29-57 3613 Small yield; bottomed in ss.
probably Miocene; elev. 487'

33 7W 20 A.L. Hunter, Operator 11-19-60 11-29-60 3747 Small yield; bottomed in Mio-
cene sediments; Yorba shale
(in Div. D) 2710, Mohnian
Div. D? 3747; elev. 475.

33 7W 20 A.L. Hunter, Operator 3-13-61 6-28-61 3337 Small yield, no commercial
production; bottomed in
siltstone, top of Yorba sh.
2355; elev. 482.

33 7W 19 Cree Oil Company 10-11-56 11-10-57 2600 In sediments at 1963', dry
hole, elev. 493'.

33 7W 29 Al Godfrey Drilling Co. 7-15-54 10-31-54 4726 Bottom not reported--probably
in ss.; dry hole; elev. 575'

33 7W 29 Isaac M. Stewart 1 'Stewart' 3-3-56 3-26-56 1890 Dry hole; bottomed in boulder
sand, elev. 575.

33 7W 34 Edgington Oil Refineries, 6-8-61 7-8-61 4371 Dry hole; base of Puente Div.
E? 2820; elev. 920; in ss.
at 4367'.

33 7W 28 Edgington Oil Refineries 4-14-61 5-5-61 4575 Dry hole; base of Repetto;
1550?; top of Puente (same);
Mid. Eocene Santiago Fm.
3200?; U. Cretaceous 4510?
elev. 667'.

33 7W 33 Pethybridge and Erlich 11-12-51 11-30-51 1505 Gas showings; no production;
bottomed in black shale;
elev. 826.5.

33 7W 33 A.L. Hunter "V.O.W.M." #1 11-15-61 11-29-61 4157 No production; Silverado fm.
50-1040; Cretaceous (Ladd Fm
1040-2540; Chino fault, 2540-
2600; Mohnian D, 2600-26400;
Olig-M. Eocene (Sespe-Santi-
ago) 2640-3935; Paleocene
(Silverado) 3935-4157; elev.
780.

3S	5E	1	U & A Oil Co.; Moore No. 1	1957	---	---	
3S	5E	1	The Texas Co.; "Edom"				
			Shore 1	1954	---	7468	
4S	6W	1	Reed, Kenneth E.;				
			Kincheloe 1	1-50	3-50	609	Elevation 950'
4S	6W	21	Hammerling, Max H.;				
			H.H.H. 1	11-51	3-52	797	Non-commercial gas and oil shows; top granite 763; converted to water well.
4S	6W	28	Elkhorn Petroleum Co.;				
			Heinlein 1	4-49	5-49	950	
4S	6W	28	Frontier Pet. Co.;				
			Berger 1	1-49	2-50	1060	Elev. 998
4S	6W	28	Johnson, C. A. (Fife Bros.;				
			Orangethorpe Oil Co.);				
			Heinlein 1 (Orangethorpe 1)	1-49	1951	678	
4S	6W	28	Palm, Peter; No. 1	6-50	6-50	825	(Ss and sh. Bottomed in. Elev. 1005)
4S	6W	28	Trabuca Oil Co.; No. 1	5-25	1931	4500	
4S	6W	28	Trabuca Oil Co.; No. 1-A		1931	4490	
4S	6W	29	V.O.D. Oil Co. Inc.;				
			Berghofer 1	11-50	1953	1823	
4S	6W	34	Mankin, John & Johnson				
			(Frontier Pet. Co.);				
			Case 1	2-50	2-50	845	elev. 1164
4S	2W	2	Neuvo Oil Co.; No. 1		1925	2225	
4S	1W	21	Grayco Oil; San Jacinto 1		Susp. 1951	210	
4S	1E	30	Wonder Oil Co.; Stroh 1	10-42	1942	2800	
4S	6W	17	A.W. Duncan	---	---	---	Wildcat; elev. about 1000'
4S	6W	28	McFadden "Uncle Bill"			800	Elev. 800'
4S	6W	28	Red Star Oil Co. "Red Star	12-30-62	3-25-63	2910	Elev. 1080 Never produced
			-Earl" #1				
4S	6W	28	Notterman, Nick L.				
			Notterman 1	5-56	7-55	851	Elev 1150 gr. Sandy sh.
4S	6W	3	Kronisch, E.; Christopher 1		1925	1190	
4S	6W	12	Berghofer, Victor; Bergho-				
			fer 1	2-50	1950	1062	
4S	5W	26	St. Pierre, Andrew, J.;				
			St. Pierre 1	9-51	1952	936	Showings reported at 400.
4S	5W	36	Great Coastal Oil Corp.;				
			No. 1	9-34	1937	2991	Basement

5S	2W	16	Dorn, Ella Chisholm; No. 1	3-50	1950	216	
5S	1W	10	Hemet Pet. Corp.; No. 1	5-27	1931	3625	
5S	1E	23	Pioneer Oil Syn.; No. 1	8-21	1923	460	
5S	7E	11	C.H.S.Co., Ltd.; Bobbie 1	12-50	1951	1901	Fine-grained gray sand.
6S	4W	18	Arnold, Anne; Conklin-Walker 1	5-52	1952	2306	Eocene?
7S	3W	14	Murrietta Valley Oil Co.; No. 1	6-23	1925-26	1120	Jurassic
7S	3W	23	Albert Pet. Corp. (Fidelity Realty Corp.); Watt 2	7-29	1939	2786	Jurassic
7S	3W	23	Fidelity Realty Corp., Ltd. (Hall, Holtz & Hennessy); Watt 1	6-28	1929	956	
7S	3E	21	Bent, Crawford H.; Bent 1	8-51	1951	383	Granite
7S	10E	25	Spindle Top Oil Assn., No. 1	2-23	1937	3800	Pliocene?
8S	1W	13	Palomar Petroleum Co. Tyrrell 1	11-46	1948	2594	

Rare Earths

Ajax Claims

Location: E $\frac{1}{2}$ sec. 6, T. 2 S., R. 10 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Gold Park, 9.2 miles S. 32° E. of Four Corners, Twentynine Palms (see pl. 1/).

Ownership: Milton E., and Earl C. Tubbs, 8315 E. 5th Street, Downey, own 2 unpatented claims (March 1959).

History: Probably located during the period of uranium prospecting during the middle 1950's.

Geology: The Pinto gneiss is intruded by hornblende-rich Gold Park gabbro-diorite. Several minor faults cut the strongly foliated gneiss. No mineralization was observed and no radioactive anomaly was recorded.

Development: Four shallow prospect pits are all in the Pinto gneiss. The upper two are in a minor fault zone. The claims were not being worked in March 1959.

Production: Undetermined.

References: None.

J.R.E. 3/19/59.

Baby Blue Prospect

Location: N $\frac{1}{2}$ sec. 9, T. 2 S., R. 10 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, Music Valley, 10.7 miles S. 39° E. of Four Corners, Twenty-nine Palms (see pl. 1/).

Ownership: James E., Charles R., and Harold R. Stewart have filed one unpatented claim (March 1958).

History: Undetermined.

Geology: Minute reddish-brown grains of thorium bearing rare-earth phosphates (xenotime and monazite (?)) occur sparingly in biotite rich zones in the Pinto gneiss. The gneiss is typified by whitish coarse-grained augens of plagioclase feldspar. A net radioactivity of .09 milliroentgens per hour was recorded at the blasted-off face of a minor cliff.

Development: A bulldozer cut ~~is~~ along the top of a minor ridge, ^{has exposed radioactive gneiss.} The north slope of this ridge is rather sharp and its steepness accentuated by blasting. Several tens of yards west of the scrape is a 8-foot deep prospect pit. The prospect was not being worked in March 1959.

Production: Undetermined.

References: None.

J.R.E. 3/17/59.

Desert View Claim

Location: Secs. 31 and 32, T. 5 S., R. 10 E., S.B.M., Cottonwood Spring quadrangle, 1958; Little San Bernardino Mountains, about 16 miles east of Indio and 1½ mile northwest of Cactus City.

Ownership: Willis Murphy, Rt. 3, Box 1076, Yucaipa, owns 1 unpatented lode claim (January 1960).

History: In 1952 the claim was owned by Willis Murphy and E. H. Kreuger of Yucaipa Valley (Walker, Lovering and Stephens, 1956, p. 26).

Geology: Pinto gneiss is cut by several muscovite-garnet pegmatite dikes. One dike trends north, dips west and is as much as 2 feet thick. It has been intermittently exposed about 50 feet along the strike. Radioactive rare-earth bearing minerals (probably monazite and/or xenotime) are apparently sparsely and locally distributed in the gneiss. The dikes were not detectably radioactive.

An assay of two selected specimens collected in pits adjacent to the discovery monument show an equivalent uranium content of 0.13 and 0.15 percent, and a uranium content of 0.01 and 0.005 percent, respectively (Walker, Lovering, and Stephens, 1956, p. 26).

Development: Several shallow pits and bulldozer scrapes plus a 35-foot trench are cut in the Pinto gneiss; generally along dike-gneiss contacts.

Production: None.

References: Walker, Lovering, and Stephens, 1956, p. 26.

J.R.E. 1/28/60.

Live Oak Tank Area

Location: Secs. 17 and 16, T. 2 S., R. 9 E., S.B.M. (proj.), Lost Horse Mountain quadrangle, 1958; Joshua Tree National Monument about 9½ miles south of Twenty-nine Palms, and 1 mile northeast of Jumbo Rocks Campground.

Ownership: Undetermined.

History: The Live Oak Tank area was examined by D. G. Wyant of the U. S. Geological Survey on December 13, 1948 as part of a study of radioactive deposits in California.

Geology: Monazite-bearing black sand of Recent age occurs in discontinuous patches on the surface of a dry wash. The sand patches range in length from a few inches to several feet, and are from 1 mm. to half an inch thick. Most of the sand was derived from White Tank Quartz Monzonite, and probably was deposited on the surface of the dry wash in the closing stages of the last flash flood. Samples of White Tank Quartz Monzonite and Pinto Gneiss were analyzed for equivalent uranium, and uranium content (Table 1/). Most of the anomalous radioactivity in this area was attributed to thorium in monazite and xenotime, and to a lesser extent to radioactive titanite, zircon, and biotite (Walker, Lovering, and Stephens 1956, p. 25).

Development: None. Good gravel and dirt roads
provide ready access to the area.

Production: None.

References: Walker, Lovering, and Stephens, 1956,
p. 25).

J.R.E. 1/25/60

Table 1/. Sampling data, Live Oak Tank area,
Riverside County, California (after Walker, Lovering, and
Stephens, 1956, p. 25).

Rock Products

1028A

R ...for Mr. Gray's approval...

Mr. Raymond W. Mc Gilliard
111 Main Street
Tulsa, N.M. 88101

Dear Mr. McGilliard:

Enclosed is a photocopy of a quarry description from the as yet
published report titled "Mines and Mineral Resources of Riverside County, California."

mineral

Blarney Stone (Harlow, Corona) Quarry

Location: SW $\frac{1}{4}$ sec. 15 (proj.), T. 4 S., R. 6 W., S.B.M.,
Lake Mathews quadrangle, 7 $\frac{1}{2}$ ', 1953; about 6 miles south-
east of Corona along the east side of Temescal Wash, half
a mile south of Cajalco Road.

Ownership: ^{Miss Lela May} ~~Harlow~~, Harlow, Cajalco Road, Corona. Leased
by Stringfellow Quarry Company, P.O. Box 6, Riverside, and
operated under the name Corona Quarries, Inc.

History: Area was first quarried about 1935 to 1939 by
Pantages Construction who quarried rock for the A.T. & S.F. R.R.
Co., probably for track ballast. Quarry was idle until
1953 when the Stringfellow Company together with the
Livingston Rock and Gravel Company, Inc. reopened the
quarry and began large scale operations. The quarry has
since been intermittently active and has supplied broken
or crushed stone to a number of projects including:
Long Beach drainage canal, 1955; San Gabriel Canyon, 1957;
Santa Ana River levee in Orange County, 1958; Long Beach
area flood control channels, 1958-62. In January 1963
the quarry was being maintained on a stand-by basis.

B1
 Geology: Three rock types have been quarried from three adjacent bodies, each about a quarter of a mile by half a mile in plan. These Cretaceous rock bodies crop out along the railroad cut on the east side of Temescal Wash and from north to south are: dark gray, fine grained, San Marcos Gabbro; buff to gray, fine grained granophyre; and light gray to tan quartz monzonite. In addition, some masses of Bedford Canyon Formation (Triassic?) hornfels probably are included in these intrusive bodies. Although several distinct rock types are included in the quarry the rock might be described in more general terms as a closely to moderately jointed medium gray dense rock with a few phenocrysts and rust stained fractures. Tests on 3 samples from the Blarney Stone quarry made about 1939 by the District Laboratory, Corps of Engineers, U. S. Army, showed the following:

Specific Gravity	Absorption	L. A. Rattler, % loss at 500 Revs.		
		average	minimum	maximum
2.71	0.3	13.4	15.8	11.0

Because of the joint pattern large size rock is not purposely produced as it would result in excessive waste and the quarry is used mostly as a source of rip rap but also yields some derrick stone. Any large boulders that do occur are stockpiled for special jobs.

Development: An irregular area nearly 2,000 feet long has been quarried, mostly on one level, along the railroad. The principal quarry area is about 1,000 feet long and 300 feet wide with sloping face 300 feet high. Some mining is done directly by 3-yard dipper shovels but in other places the rock is harder and requires drilling and blasting. Standard quarry equipment is employed such as Caterpillar tractors with front end loaders (rock baskets) and bulldozers, drop ball cranes, dipper shovels, jackhammers, and air Tracdrills. Facilities for making small sized material include grizzly, bin, jaw crusher, and vibrating screens. Processed material goes by belt conveyor to storage bins or stockpiles. About 50 percent of the rock mined is waste. A small proportion of this fine size material is sold for road base and other uses, but much of it must be stockpiled.

Biore
Production: In recent years when in full operation quarrying has been at the rate of 6,000 tons per day. In 1958 about 250,000 tons of small rock were furnished to the Orange County Santa Ana River Levee and since 1958 about 500,000 tons of rock have been furnished to Long Beach Area flood control channels. Total production is not known, but is believed to be more than one million tons.

References: none.

C.H.G. 5/21/63.

Blue Diamond Materials Company

See: Temescal rock quarry under roofing granules.

Broken to ...

Corona Quarries, Inc.

See: Blarney Stone Quarry.

Delano Black Granite

Location: W $\frac{1}{2}$ N $\frac{1}{2}$ SE $\frac{1}{4}$, W $\frac{1}{2}$ and NE $\frac{1}{4}$ Gov't. Lot 7, SW $\frac{1}{4}$ Lot 2, SE $\frac{1}{4}$ Lot 3, E $\frac{1}{4}$ Lot 6, Lots 9 and 12 sec. 32, W $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 33, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle 7 $\frac{1}{2}$ ', 1953; bouldery terrain of the Gavilan Hills about 5 miles west of Perris in western Riverside County, along both sides of Santa Rosa Road at the old Virginia (Virginia-Shay, Missing Link) mine, adjacent to the Royal Black granite quarry (see herein).

Ownership: Bert Gilmer and associates, 4325 East San Miguel, Phoenix 18, Arizona hold a 160-acre association placer claim (Delano mining claim, W $\frac{1}{2}$ N $\frac{1}{2}$ SE $\frac{1}{4}$, W $\frac{1}{2}$ and NE $\frac{1}{4}$ Gov't. Lot 7, SW $\frac{1}{4}$ Lot 2, SE $\frac{1}{4}$ Lot 3, E $\frac{1}{4}$ Lot 6, Lots 9 and 12 sec. 32, excluding patented areas) and own 80 acres of fee land (W $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 33).

History: This area was extensively prospected for gold before 1900 with some activity through the 1940's. A number of old shafts, adits, and pits in section 32 reflect this early search for metals. Monument stone was quarried briefly about 1930 from several small workings north of Santa Rosa Road in the NW 1/4 section 33. Apparently this was the first stone operation in this area and was followed in 1936 by the opening of the adjacent Royal Black granite quarry. After an idleness of nearly 35 years the property again became active in June 1964 when the Delano mining claim was located. By October 1964 stone had not been shipped but location work had been done and development work was in progress.

Geology: This property is underlain by part of the same body of distinctive reddish-brown or bronze-weathering basic igneous rock as described under Royal Black granite quarry (which see herein).

Two samples were collected by geologists of the California Division of Mines and Geology in October 1964, from a shallow face opened at the NW Corner of SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 32, on the south side of a prominent drainage. Preliminary microscopic examination of these samples showed the following:

Sample G-1: Biotite quartz norite.

Hypautomorphic-granular, medium to coarse grained.

Melanocratic appearing.

Labradorite	70%	(Mineral percentages approximate)
Hypersthene	12%	
Biotite	8%	
Quartz	6%	
Augite	4%	

Minor hornblende, apatite, K-spar, zircon and ores.

Sample G-2: Pyroxene-biotite-hornblende quartz diorite.

Hypautomorphic-granular, medium to coarse grained.

Melanocratic, but in hand specimen lighter in color than G-1.

Andesine	53%	(Mineral percentages approximate)
Hornblende	15%	
Biotite	15%	
Augite	12%	
Quartz	4%	
Hypersthene	1%	

Minor K-spar(?), apatite, zircon, and ores, and white mica, secondary after plagioclase.

Development: Several small faces have been opened and roads built or repaired throughout the property. Sampling and testing are reported to have been done. In the NW $\frac{1}{4}$ section 33, about 300 feet north of Santa Rosa Road on the south slope of a low knoll is an open-cut bench about 50 feet wide with face 12 feet high. This cut apparently was made when the property was first quarried about 1930.

Production: A few tons of monument stone in the 1930's. By December 1, 1964 the present operators had not yet placed the property in production.

References: Dudley, 1935, p. 501, 506, map facing p. 506; Larsen, 1948, p. 46, 47.

D.M.M. & C.H.G. 12/1/64.

Harlow Quarry

See: Blarney Stone Quarry.

Hawley Rock Quarry

See: Temescal Canyon Rock Quarry.

Development: Rock has been removed from two quarries in gentle, low hills. The south quarry (NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 5) is roughly circular in plan and about 250 feet in diameter. It was worked from a single level with the face 10 to 40 feet high, but has potential backs of about 80 feet. The second quarry is about half a mile to the north (NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 5) and is opened on one level about 500 feet long in a southeast-northwest direction with the bench about 150 feet wide. The face is from 25 to 75 feet high with potential backs of about 120 feet.

Production: Large, but undetermined total tonnage. In 1962 the north quarry furnished about 30,000 tons of riprap material for the San Pedro Cabrillo area.

References: Gray, 1961, p. 88-89, 117.

7/20/63
C.H.G. 8/20/62.

Development: A large tonnage of loose granodiorite remains on the floor of Ormand quarry from former large scale operations. Much of the material is of suitable size for the plant but some large boulders are split by blasting; drilling is by jackhammer. Loose rock is loaded by 3/4 yard Northwest 25 power shovel on to small end dump truck which hauls the material to the plant, about half a mile south of the quarry. Here the truck discharges over a grizzly feeder to a 20- by 30-inch primary jaw crusher which yields a 4-inch maximum product. Material then goes to a 4- by 6-inch secondary jaw crusher the product of which is elevated to shaker screens. Over-size goes through a scalper trommel screen and the plus 3/4-inch material is sent to a gyratory crusher and the minus 3/4-inch material goes to a roll crusher. The plant employs an extensive dust control system. Finished product, all of which is marketed for poultry grit, ranges from 3/16-inch to 1/2-inch in size. Most of the grit is packaged in 100 pound paper bags, but some bulk material is sold. Material from this plant is marketed under the trade name "Haven Granite Grit" in six standard sizes throughout the western states and Hawaii.

Production: Total undetermined, plant capacity is 60 tons per day.

References: Gay, 1957, p. 578-579.

C.H.G. 1/23/63.

Jameson Quarry

Location: SW $\frac{1}{4}$ sec. 29, T. 3 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about one mile west of Home Gardens in low hills on the north side of old State Highway 18.

Ownership: Mrs. Mary C. Jameson, 316 East Olive Street, Corona, owns about 55 acres of patented ranch land (1957).

History: Small quarry opened at some unknown time before 1924. During 1939-40 it was operated extensively by J. B. Stringfellow, Riverside, and furnished rubble, riprap, derrick stone, and toe rock used to face Prado Dam and its abutments. The property then remained idle until about 1950 when Mr. Stringfellow quarried a small tonnage of rubble stone. Since 1950 the quarry has been inactive, except for the occasional gathering of small amounts of remaining loose material to be used locally as ornamental stone.

Geology: Pink, fine-grained, granular micropegmatite granite crops out over an area about 2 miles long and ranges from a quarter of a mile to three-quarters of a mile in width. The rock occurs as reddish-brown, sheet-like masses and is well jointed so as to break into crude rectangular blocks. Apparently there are substantial reserves of material suitable for small or medium sized rubble stone.

Development: Rock was quarried on one level from a north-south bench about 200 feet long with the face 10 to 50 feet high. Potential backs are about 80 feet.

Production: Large, but undetermined tonnage.

References: Gray, 1961, p. 87-88, 117.

C.H.G. 8/17/62.

(Bullock & Crumley 1862)

Matich Brothers and Sundt Company Quarry

See: Temescal Canyon rock quarry.

Specialty Sands

Ormand Quarry

Location: NW $\frac{1}{4}$ sec. 9 (proj.), T. 2 S., R. 5 W., S.B.M., San Bernardino quadrangle, 1954; at Ormand Siding on the west side of the southern Crestmore Hills, at the north end of Pacific Avenue, about $3\frac{1}{2}$ miles northwest of Riverside.

Ownership: Guy F. Atkinson Company, Santa Fe Avenue and 223rd Street, Long Beach, owns about 640 acres, most of which is in section 9.

History: The Ormand quarry was opened by the Hauser Construction Company in August 1925 to supply stone for the Long Beach Harbor breakwater. At that time the operation was locally called the Kumpe-Hauser quarry. By mid 1929 the Long Beach breakwater project had been completed and the quarry was furnishing rock for Rainbow pier at Long Beach. From late 1929 until 1944 the quarry was only intermittently active on a relatively small scale, but did supply rock for some Metropolitan Water District aqueduct dams and other similar structures. Apparently at least during part of this period it was known as the Rohl-Connolly quarry. About 1944, the quarry was acquired by the Guy F. Atkinson Company and during 1944-45 was operated on a large scale by Atkinson to supply rock for the Seal Beach breakwater. Since 1945, the quarry has been maintained on a stand by basis and has furnished small tonnages of rock intermittently for several projects. Since 1952, the Haven Granite Company (described herein) has utilized rock blasted down during former large scale operations as a source of poultry grit.

Geology: Quarry opened in a large mass of Cretaceous granodiorite (Woodson Mountain Granodiorite?) which crops out over much of the north half of section 9. The granodiorite forms bouldery hills that rise abruptly to heights of 800 feet above the alluviated valley. The granodiorite ranges from fine- to coarse-grained, is light gray to gray, contains only a small proportion of ferromagnesian minerals, and in a few places contains dark inclusions. The entire quarry appears to be in granodiorite except for an area of schist and gneiss about 400 feet wide at the south end of the north-trending face. The granodiorite is dense, but is jointed and breaks into large blocks. Tests on 8 samples from the Ormand quarry made about 1939 by the District Laboratory, Corps of Engineers, U.S. Army, showed the following:

Specific gravity	Absorption	L. A. Rattler % loss at 500 Revs.		
		Average	Maximum	Minimum
2.78	-----	38.4	41.9	34.7

Development: Main quarry, on one level, trends north. It is 2,200 feet long and the face has a maximum height of 290 feet. At the south end of the face is an unquarried area about 400 feet wide of schist and gneiss. Trending southeast from the unquarried area is a second face about 400 feet long and 200 feet high. All heavy duty quarrying equipment has been removed from the property. Quarrying methods used during the former large scale operations are described by Tucker and Sampson 1929, p. 509; 1945 p. 166).

Production: 1925-29 (2 million tons of riprap for Long Beach breakwater); 1944-45 (700,000 tons for Seal Beach breakwater); undetermined smaller amounts at various times. Since 1952, a few hundred tons per month of remaining loose rock has been crushed for poultry grit by the Haven Granite Company (See herein). Total production is probably well over 3 million tons.

References: Tucker and Sampson, 1929, p. 509; The Explosives Engineer, Oct. 1929; Tucker and Sampson, 1945, p. 166; Gay, 1957, p. 586.

C.H.G. 1/23/63

Pacific Rock and Gravel Co. Quarry

See: Temescal Canyon Rock Quarry.

Quarry
Palo Verde Dam Quarries

SE 1/4 NE 1/4
Location: ~~NW 1/4~~ sec. 14, T. 5 S., R. 23 E., (~~SW 1/4~~ sec. 18
and ~~NW 1/4~~ sec. 19, T. 5 S., R. 24 E., S.B.M.), Blythe N.E.
quadrangle, 1951; about 13 1/2 miles by road (U.S. 95), north
of Blythe.

Ownership: Public domain (1958).

History: Riprap and fill material was first taken
from ^{this} ~~these~~ sites in 1945 when the U. S. Government
built a temporary rock weir to restore the surface
level of the Colorado River for the Palo Verde Irri-
gation District. ~~The level of the river had dropped as~~
~~a result of desilting in the lakes behind Boulder, Parker~~
~~and Headgate Rock dams.~~ During the years 1954 to 1956
material was quarried for the construction of the more
permanent Palo Verde Dam (Palo Verde Irrigation District
reports, 1954 and 1957).

✓
Geology: (~~Two quarries yielded materials for the diversion dam. One is just west of the damsite in sections 18 and 19. This quarry is in alluvium and adjacent to exposures of gneissic granite. Both the alluvium, which consists of gravel, sand, clay, and cliche, and the gneissic bedrock, were quarried.~~) The heavier ^{limestone} riprap was quarried from the walls of a narrow canyon in section 14, about 1½ miles northwest of the dam. The material is dense, finely crystalline, dolomitic limestone. It is well bedded; ^{and} individual beds range from one inch to ten feet in thickness. In the quarry the ^{limestone beds} strike is northeast and the dip about 30° to the southeast. The thickness and extent of the

^{deposit} formation was not determined,

^{but it is part of extensive deposits of limestone dolomite, and is in the limestone of the Paleozoic or Maria Formation which underlies much of the Big Maria Plateau.}

Development: (~~The quarry near the damsite consists of a shallow pit 150 feet to 200 feet in diameter and several cuts along a shallow arroyo.~~) The riprap quarry in section 14 has two faces; one on either side of the canyon. The southwest face is about 400 feet long and 50 feet high. The other face, opposite it, is about 200 feet long and 50 feet high.

X

Production: ~~The total yardage of material used in the dam projects was~~ Not determined.

References: Palo Verde Irrigation District annual reports for 1954 and 1957. Saul Evans, and Gray, 196- , p.

R.B.S. 11/19/58.

C.H.G. 1/7/64.

(Broken & stained 1/2)

Phillips Quarry

See: Sidebotham quarry.

Riverside County
Rock Products
Dimension Stone

Royal Black Granite Quarry

Location: E $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{4}$ W $\frac{1}{2}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ Gov't. Lot 7 sec. 32, NW $\frac{1}{4}$ SW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 33, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle 7 $\frac{1}{2}$ ', 1953; bouldery terrain of the Gavilan Hills about 5 miles west of Perris in western Riverside County, quarry is a quarter of a mile south of Santa Rosa Road and the old Virginia (Virginia-Hay, Missing Link) mine.

Ownership: Royal Black Granite Quarry, P.O. Box 487, Escondido (Robert M. Johnson and others, P.O. Box 123, Perris) holds a 160 acre association placer claim (Royal Black mining claim, E $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{4}$ W $\frac{1}{2}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ Gov't. lot 7 sec. 32, excluding patented areas) and owns 60 acres of fee land (NW $\frac{1}{4}$ SW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 33).

History: This area was extensively prospected for gold before 1900 with some activity through the 1940's. A number of old shafts, adits, and pits in section 32 testify to this early search for metals. Apparently this property was first quarried for dimension stone in 1936 when Smil John^{son} opened the Royal Black granite quarry at the site of the present quarry and also at the hillcrest a quarter of a mile to the southwest, where most of the quarrying was done. This quarry was active until 1948 as a source of dimension stone and a few larger blocks. According to the owner polished black facing stone on the Los Angeles Times building was supplied from this quarry, as was facing stone for buildings as far distant as Canada and Oregon.

After an idleness of about 25 years the Royal Black mining claim was located in August 1963, a large Guy derrick was installed and quarrying began. The quarry was largely inactive during most of 1964, but some development work was done on other parts of the property.

Geology: The quarry area is underlain by a distinctive reddish-brown or bronze-weathering basic igneous rock. On fresh surfaces the rock is black and commercially is termed "black granite", although microscopic examination indicates it ranges from gabbro-necrite to quartz diorite in composition. This rock mass is an unusual part of the southern California batholith for several reasons. First, physically, it is an extremely constant, even grained, massive rock and at every place observed is inclusion free. Secondly it occurs as exceptionally large unfractured blocks. Blocks at least 20 to 30 feet square are seen in the quarry face; the blocks being separated by seams and cracks. In addition the composition of the rock is uncommon for rocks of the Southern California batholith. As is usual in black granite the rock does not display well defined rift, grain or hardway splitting directions, such as are commonly seen in regular granite bodies.

Dudley (1935, p. 501, map facing p. 506)
named this rock the Virginia Quartz-Hypersthene Norite
because of its occurrence near the old Virginia mine
and its composition. He reported that microscopic
examination showed the rock to contain 51% plagioclase
(labradorite), 6% orthoclase, 14% quartz, 12% hyper-
sthene, 8% biotite, and 6% augite and hornblende with
the accessory minerals zircon, apatite, rutile, and
magnetite. Dudley's map shows this rock body to extend
west from the Virginia mine for a distance of about
3 miles and to range from about 3/4 mile to 1/2 mile in
width. The area is included in the large region later
studied by Larsen (1948), but because of the scale of
the map Larsen (1948, pl. 1) included the Virginia
Norite with his San Marcos Gabbro. Larsen (1948, p. 46-
47) did recognize and describe an east-west body of
quartz norite located about 6 miles west of Perris,
apparently the same rock body earlier described and
mapped by Dudley (1935).

A brief geologic examination of the area made by geologists of the California Division of Mines and Geology in August and October 1964, suggests that rocks of the same type and apparent quality as the dark colored rock being quarried may exist throughout most of an area about one mile long and perhaps three quarters of a mile wide. Within this area there are also zones of pale whitish gray to gray rock which may be in bodies large enough for quarrying. Preliminary microscopic examination of two samples of the dark rock, one from the active quarry (N-1) and one from a prospect at the guy station east of the quarry (59-2), showed the following:

Sample N-1: Quartz diorite.

Hypautomorphic-granular, medium to coarse grained.

Melanocratic appearing.

Andesine	56%	(mineral percentages approximate)
Biotite	16%	
Augite	14%	
Quartz	13%	
Hypersthene	1%	

Minor K-spar, hornblende, apatite, zircon and ores.

Sample 59-2: Quartz diorite.

Hypautomorphic-granular, medium to coarse grained.

Melanocratic appearing.

Andesine	60%	(mineral percentages approximate)
Quartz	15%	
Pyroxene	12.5%	
(Clinopyroxene, orthopyroxene)		

Biotite	12.5%
---------	-------

Minor K-spar, hornblende, apatite, zircon, ores

Tests made on samples from the Royal Black granite quarry were as follows:*

Compressive strength: method of test ASTM C170-50

Sample number	Compressive strength
1	32,600 psi
2	29,500 psi
3	35,100 psi
Average	32,400 psi

Absorption test: method of test ASTM C97-47

Sample number	Absorption
1	0.03%
2	0.03%
3	0.03%
Average	0.03%

*Testing by Twin City Testing and Engineering Laboratory, Inc., 2440 Franklin Ave., St. Paul 14, Minn. dated Oct. 10, 1963 - test data courtesy of Royal Black Granite Quarry, P.O. Box 487, Escondido, California.

Development: Principal quarry is a single north-south bench level about 300 feet long, 100 feet wide, with face 50 to 75 feet high. In addition several faces have been newly opened or reopened near the crest of the hill above the quarry, but have not been quarried during the present operation.

In the quarry large blocks are loosened and trimmed by careful blasting. Loosened blocks are then moved from the face by means of a Guy derrick with 115-foot high mast and 100-foot boom, loaded on trucks, and transported to rail cars at Ferris. Blocks shipped are in the range of 8 to 30 tons and have dimensions in the range of about 5'x5'x15' to 5'x8'x12'.

The blocks are shipped for finishing to the Delano Granite Works, Inc., quarries^r and manufacturers of structural and monumental granites, Delano, Minnesota. Here the blocks are trimmed and cut to desired sizes for building facing stone and monument stone. After polishing the finished stone is trucked to the job site. In 1963 this stone was used in Ogden, Utah and late in 1964 was scheduled for a new Federal building in New York City, a job that will require shipment of about 3,000 tons of stone.

Production: About 1,000 tons to Nov. 1, 1964. The rock is sold for \$5.50 per cubic foot on rail cars at Perris.

References: Dudley, 1935, p. 501, 506, map facing p. 506; Larsen, 1948, p. 46, 47.

D.M.M. & C.H.G. 12/1/64.

Broken and Cracked
Stone

Sidebotham (Phillips) Quarry

Location: $W\frac{1}{2}NW\frac{1}{4}$; $NW\frac{1}{4}SW\frac{1}{4}$ sec. 5, T. 4 S., R. 6 W.,
S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 2
miles southeast of Corona, south of Temescal Wash and
east of Compton Siding.

Ownership: Temescal Clay, Inc. c/o F. A. Stearns,
El Cerrito, Corona, owns about 100 acres of patented land in
section 5 (1963).

History: Two quarries opened in the middle 1930's
to furnish rubble, riprap, and track ballast for the
A.T. & S.F.R.R. Co., who reported production during
1935-39. The south quarry has since been inactive, but
the north quarry was reopened and operated by Silber-
berger Constructors, Inc., Quest Haven Road, San Marcos,
during the latter part of 1962. Early in 1963 it too was
inactive. In July 1963, Silberberger Constructors again
reactivated the north quarry to supply 50,000 tons of
riprap material to the Orange County coastal area.

Geology: Rock exposed in the quarry area is an equigranular to somewhat porphyritic, medium-grained granodiorite. The rock is dark gray to blue-gray on weathered surfaces and dark greenish-gray on fresh surfaces and is hard, irregularly jointed, and breaks into large, blocky, generally unweathered masses. The north quarry has about one foot of red soil overburden and 3 to 5 feet of weathered granodiorite below the soil. The face shows a few thin seams of altered clay-like material. Tests on two samples from the Sidebotham quarry made about 1939 by the District Laboratory, Corps of Engineers, U. S. Army, showed the following:

L. A. Rattler, % loss at 500 rpm

Specific gravity	Absorption	Average	Maximum	Minimum
2.70	0.2	12.2	13.2	11.1

7064-

Stringfellow (Bly Brothers and McGilliard, Shannahan) Quarry

Location: NW $\frac{1}{4}$ and SE $\frac{1}{4}$ sec. 1, T. 2 S., R. 6 W., S.B.M., San Bernardino quadrangle, 1954; about 6 miles northwest of Riverside in the central part of the Jurupa Mountains, north of Glen Avon Heights at the north end of Pyrite Street.

Ownership: Stringfellow Quarry Company, P.O. Box 6, Riverside.

History: These quarries were first operated about 1900 by the West Riverside Granite Company. By 1905 Bly Brothers were working two quarries which furnished a large quantity of granite used for building purposes. The rock was shipped to Los Angeles for cutting and finishing at the firm's stoneyard. Annual production of 120 carloads of dimension stone and 1,200 carloads of riprap is reported for 1914, at which time the operation was known as Bly Brothers and McGilliard Stone Company. In 1928, about 150 tons of rock was shipped each month to Los Angeles where the rock was ground for use as roofing material and chicken grit. Since the 1920's the principal product has been harbor riprap for breakwaters and seawalls (Long Beach breakwater 1925-29; Seal Beach 1944-49; Redondo Beach 1953-56; 1956-63 various harbor and flood control projects). During the 1940's the property operated under the name Shannahan Quarries. The quarries were acquired by the Stringfellow Quarry Company about 1951 and have since been active each year.

Geology: The quarries are in a roughly rectangular shaped mass of Cretaceous Woodson Mountain Granodiorite about 2,000 feet by 1,000 feet in plan. Two sets of joints, one set trending east and about 8 to 10 feet apart, and the other set trending north assist quarrying operations. Overburden is generally not present, but weathered debris averaging 1 foot in thickness overlies the granodiorite in places.

Tests on 8 samples from the Shannahan quarry made about 1939 by the District Laboratory, Corps of Engineers, U.S. Army, showed the following:

Specific gravity	Absorption	L.A. Rattler, % loss at 500 revs.		
		Average	Maximum	Minimum
2.68	0.4	38.6	43.8	32.2

Development: Two quarries and a few small prospect cuts. The smaller quarry, in the NW $\frac{1}{4}$ sec. 1 and known as the old quarry, is circular in plan and about 300 feet in diameter with maximum face height of 150 feet. It has been inactive since before 1930. About 800 feet to the southeast and in the SE $\frac{1}{4}$ sec. 1 is the new quarry. By 1929 it had been developed on one level 150 feet long with face height of 80 feet, in 1950 the bench was 700 feet long and 75 feet high, and by 1963 the quarry was L-shaped with a total length of 1,500 feet and maximum face height of 200 feet. Primary blasting is infrequent and is usually by the coyote hole method, secondary shooting is by jack hammer drilling. Loading at the quarry is by $\frac{3}{4}$ yard to 3 yard power shovels or crane and rock hook, depending on rock size. To make small sizes material is trucked to an adjacent plant which utilizes a feeder grizzly, jaw crusher, and standard Hewitt Robins screens to size the rock. Products include riprap, derrick stone, and building stone. Most of the material used for flood control riprap is 4 inches or larger, with a range of 1-inch to 15-inches. Material as large as 3 to 4 tons is also quarried.

Production: By 1929 the property is reported to have yielded about 600,000 tons of stone and since 1951 the Stringfellow Quarry Company has produced about 750,000 tons. In recent years production has averaged 50,000 to 75,000 tons per year, and some years more than 200,000 tons are shipped. Total production is unknown but certainly is well over one million tons.

References: Aubury, 1906, p. 42-44; Merrill, 1917 [1919], p. 585; Tucker and Sampson, 1929, p. 508; Tucker and Sampson, 1945, p. 166; Mackevett, 1951, p. 13, pl. 1; Gay, 1957, p. 573, 586.

C.H.G. 1/21/63.

Temescal Canyon (Hawley, Pacific Rock and Gravel Co.) Rock W
Rock Quarry

Location: SW $\frac{1}{4}$ sec. 33, T. 3 S., R. 6 W.; NW $\frac{1}{4}$ sec. 4,
T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ',
1954; one mile south of Home Gardens along the east side
of Temescal Wash near its northwest end.

Ownership: James Spires, Anaheim owns the north quarry
and Pacific Rock and Gravel Company, 400 East Arrow High-
way, Arcadia owns the south quarry and adjoining property
totaling 670 acres (July, 1963).

History: The Temescal Canyon Rock quarry was first
opened in May 1957 by the Temescal Rock Products Company,
Corona to supply stone for a levee being constructed along
the Santa Ana River west of Riverside. By September 1957
Matich Brothers and Sundt Company Contractors, Colton was
the operator. The quarried product included facing stone,
toe stone, and derrick stone in several sizes ranging from
1 pound to 4,500 pounds. The levee project was completed
in 1958 and the quarry was inactive until 1960 when Hawley
Rock, Inc., 5277 North Vincent Avenue, Azusa reopened the
quarry under the name Hawley Rock Quarry, Inc. to supply
rock for flood control channels. The quarry has been
intermittently active on a stand-by basis since 1961. In
July 1963, the south quarry was acquired by Pacific Rock
and Gravel.

T.C.

Geology: Most of the rock in the quarry area is an equigranular to somewhat porphyritic granodiorite, a medium-grained, dark-colored intrusive rock of Jurassic or Cretaceous age. The granodiorite is dark gray to blue-gray on weathered surfaces and gray to dark greenish-gray on fresh fractures and forms subrounded hills. In the north quarry only granodiorite is exposed, but in the south quarry is exposed a small mass, about 300 feet long and 25 to 50 feet wide, of dark blue-black quartz latite porphyry. The porphyry is surrounded by the granodiorite. Large reserves are available, as the granodiorite crops out in a belt more than one mile long and about 1,000 feet in average width. In 1957 the U.S. Army Engineer Division Laboratory, Corps of Engineers, Sausalito, tested samples of the granodiorite and obtained the following data:

u.ft.	Apparent Specific gravity	Specific gravity Saturated, surface dry	Absorption	L.A.Rattler, % loss at 1000 rpm	
				Grade E	Grade F
	2.721	2.712	0.19	19.2	19.7

T.C.

Development: Two quarries about 1,250 feet apart on the east side of Temescal Wash. Here the rising topography provided a natural slope for the initial quarry face which was steepened by blasting to form a face about 60 feet high. Potential maximum backs are about 250 feet above the floor of Temescal Wash. In 1963 the north quarry was about 325 feet long and 200 feet wide with face 40 feet high; the south quarry was somewhat semicircular in plan and was about 150 feet long, 250 feet wide, and with face about 150 feet high.

Production: About 250,000 tons during 1957-58, and about 150,000 tons during 1960-61. Apparently since 1961 only small intermittent production.

References: Gray, 1961, p. 89-91, 117.

C.H.G. 7/20/63.

Temescal Rock Company

See: Temescal rock quarry under roofing granules.

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(Bulw & Co. Inc.)

Temescal Rock Products Company

See: Temescal Canyon rock quarry.

Christopher Mines, Inc. Claims

Location: SW $\frac{1}{4}$ sec. 36, T. 2 S., R. 3 E., S.B.M.,
Whitewater quadrangle, 7 $\frac{1}{2}$ '¹⁴¹, 1955; reported (Proctor,
unpublished thesis, 1958) to be between the Super
creek Mine and Painted Hills Quarry (see herein).

History: Undetermined.

Geology: Same as Painted Hills Quarry (see herein).

Development: Undetermined.

Production: Undetermined.

References: Proctor, unpublished thesis.

R.B.S.

Dendrite

Dendrite Deposit

Location: Sec. 14 (?) T. 2 S., R. 12 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Pinto Mountains, nearly 600 feet northwest of the Duplex mine and about 6 miles southeast of New Dale (site). (See pl. 3/).

Ownership: Walt Rose and Charley Wade, General Delivery, Twentynine Palms, own at least one unpatented claim.

History: The deposit was discovered in the late 1950's by the present owners.

Geology: Massive quartz monzonite is cut by a N. 80° W.-trending, steeply southwest-dipping, and very fine-grained dike. The dike is 10 feet in average width, pale green, and discolored by black dendrites of manganese oxide. As the dendrites are fernlike in appearance, the name "Fern Rock" has been applied to quarried stone. The dike is persistent and extends for at least several tens of yards west and east from the quarry pits but is only locally stained with manganese dendrites, and probably does not contain commercial material along its entire length.

Development: A small tonnage of stone has been removed from shallow open cuts and trenches which have exposed the dike about 30 feet along the strike. The rock is well cleaved near the surface and appears fairly easy to quarry to a depth of 15 feet. Stone is quarried only intermittently as no permanent market has been established.

Production: None, as of March 1960.

References: None.

J.R.E. 3/10/60

Maria Mountains Wollastonite Deposits

See under Wollastonite.

Painted Hills (Whitewater Sericite Schist) Quarry

Location: E $\frac{1}{2}$ sec. 35, W $\frac{1}{2}$ sec. 36, T. 2 S., R. #. E., S.B.M., Whitewater quadrangle, 7 $\frac{1}{2}$ ', 1955; on Painted Hill near the east bank of Whitewater River, 2 miles north of Whitewater.

Ownership: Kenneth J. Mackenzie, P.O. Box 133, Whitewater, holds 5 unpatented claims.

History: The Painted Hills Quarry was first reported as a source of sericite schist (Tucker and Sampson, 1945, p. 182, pl. 35), but the extent of actual quarrying prior to 1954, when the present owner acquired the property, was not determined. Since 1954 the property has been worked intermittently.

Geology: The Painted Hill area is underlain by a strongly foliated igneous-metamorphic complex (Allen, 1957, pls. 1, 4). The strike of the foliation ranges from west to N. 30° W. and the dip from vertical to 40° N.E. The quarried product is a sericite-rich, iron-stained, flaggy- to massive, gneissic, granitic rock. It has been marketed locally and in Los Angeles as a decorative landscaping and building material and some has been ground for roofing granules. Soft, relatively pure sericite schist is present in the quarry as lenticular bodies ranging from 0 to as much as 20 feet in thickness.

P.H.

Development: The quarry is opened in a natural amphitheater about ~~one~~ half mile in diameter, the south and southeast sides of which have been worked to a moderate extent by three open-cuts 50 to 100 feet in width and depth.

Production: The owner stated that 600 to 700 tons of rock had been marketed in the period; July 1954 through October 1960.

References: Tucker and Sampson, 1945, p. 182, pl. 35;
Allen, 1957, pls. 1, 4.
R.B.S. 10/20/60.

Super Creek Mine

Location: SW $\frac{1}{4}$ sec. 36, T. 2 S., R. 3 E., S.B.M.,
Whitewater quadrangle, 7 $\frac{1}{2}$ ', 1955; on the southeast
flank of Painted Hill. The property is reached by
means of an unimproved dirt road extending northeast-
ward 2 to 3 miles from Whitewater.

Ownership: In 1958 three claims were held by a
man named Grossman (Proctor, unpublished thesis).
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History: Undetermined.

Geology: Same as Painted Hills Quarry (see herein).

Development: Assessment work in the form of roads
and open cuts (1959).

Production: Undetermined.

References: Proctor, unpublished thesis.
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R.B.S. 12/59.

Whitewater Sericite Schist Deposit

See Painted Hills Quarry.

Blue-Gray Granite Quarry

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 14, T. 4 S., R. 4 W., S.B.M., Steele Peak quadrangle, 7 $\frac{1}{2}$ ', 1953; about 1 $\frac{1}{2}$ miles southwest of Val Verde in low, rounded hills half a mile southwest of the intersection of Cajalco Road and Seaton Avenue.

Ownership: N. B. Walters, 28 Chapel Street, Alhambra (1945). Undetermined (1963).

History: In 1929 the quarry was under lease to E. Johnson and one man was employed in the production of monumental stone. By 1945 the quarry was idle and remained idle in 1963. Periods of activity since 1945, if any, are not known, but the size of the quarry suggests that it may have been a source of broken or crushed stone, rather than monumental stone, at some period. At various times this quarry has been known by different names including Johnson, Perris, Riverside Quarry, and Riverside Granite Company.

Geology: Rock exposed in the quarry faces is light gray, medium-to coarse-grained quartz diorite with abundant ferromagnesian minerals (Cretaceous Bonsall Tonalite). In places the rock contains abundant, irregular gneissic inclusions, mostly cobble sized or smaller. The surface is weathered irregularly to depths of 5 to 10 feet, and in places irregular weathered zones extend to the bottom of the exposed quarry faces. According to Tucker and Sampson (1929, p. 508) the material being quarried was a fine-grained granite having a very uniform mineral pattern which made it an ideal monumental stone. In 1963 only limited areas of such rock were observed in the quarry faces. Tests on four samples from this quarry made about 1939 by the District Laboratory, Corps of Engineers, U.S. Army, showed the following:

	<u>L. A. Rattler, % loss at 500 Revs.</u>		
Specific Gravity	Average	maximum	minimum
2.69	65.7	100.0	48.7

Development: Oval shaped side-hill quarry about 180 feet by 150 feet with maximum face of 40 feet opens from end of a railroad spur. The quarry connects to a slot along the spur about 250 feet long, 80 feet wide and 20 feet deep. This slot may have also been quarried. Equipment in use when the quarry was active in 1929 included an air compressor, jackhammers, and a stiff-legged derrick. Apparently monumental stone was selectively quarried, judging from the large amount of large boulders in the waste pile at the north end of the railroad slot. These boulders might be a source of rubble or riprap for small local construction projects. It appears unlikely, however, that this quarry will be a favorable future source of monumental stone because of the problems presented by irregular weather^{ed}/zones, deep overburden, and irregular distribution of inclusions.

Production: Total undetermined; 250 cubic feet per month in 1929.

References: Tucker and Sampson, 1929, p. 508; Tucker and Sampson, 1945, p. 166.

C.H.G. 7/1/63.

poultry grit

Haven Granite Company

Location: SW $\frac{1}{4}$ sec. 9 (proj.), T. 2 S., R. 5 W., S.B.M., San Bernardino quadrangle, 1954; at Ormand Siding on the west side of the southern Crestmore Hills at the north end of Pacific Avenue, about 3 $\frac{1}{2}$ miles northwest of Riverside.

Ownership: Haven Granite Company, 890 South Arroyo Parkway, Pasadena 2. Plant address Route 5, Box 319-A, Riverside.

History: In 1952 the Haven Granite Company built a small plant at the Ormand quarry (described herein) to process loose rock on the quarry floor for poultry grit. This plant has since been in continuous operation and the company is the largest producer of poultry grit in California.

Geology: The mineral material utilized is Cretaceous granodiorite (Woodson Mountain Granodiorite?), see Ormand quarry for description.

Green Giant Deposit

See Storm Sulfide or Long Green Deposit.

Long Green Deposit

See Storm Sulfide or Green Giant Deposit.

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Storm Sulfide (Green Giant-Long Green)

Deposit

Location: Secs. 4 and 5 (?), T. 4 S. (?), R. 13 E., S.B.M. (proj.), U. S. Army Corps of Engineers Eagle Tank quadrangle, 15', 1943; Eagle Mountains, about 13 miles northeast of Cottonwood Spring and 7.5 miles northeast of the East Pinto Basin Road - West Pinto Basin Road - Black Eagle mine road intersection.

Ownership: Barry Storm, P.O. Box 74, Inyokern, owns two unpatented lode claims (February 1960).

History: In August 1957 the property was owned by Henry B. Tuttle, 218 South Palm Canyon Drive, Palm Springs, California. At this time Mr. Tuttle owned 4 unpatented lode claims: Green Giant nos. 1 and 2, and Long Green nos. 1 and 2. The Green Giant no. 2 (open-cut site, fig. 1/) was leased to the Lucas Mining and Milling Co., Thousand Palms (Harry T. Lucas, President). Green rock was mined and sold at \$20 per ton for roofing granules (oral communication, 8/1/57, Henry B. Tuttle).

Geology: Irregular green bodies of mixed idocrase, garnet and epidote occur in a contact zone, as much as 20 feet thick, between light colored quartz monzonite ^{narrow} {cut locally by/dense black dikes^a} and bluish-gray calcitic dolomite weathering light tan.

Development: Workings consist of bulldozer scrapes, prospect pits, an open-cut, and two adjacent adits (fig. 1/). The open-cut, from which rock for roofing granules was extracted, is 60 feet long, 40 feet wide, and 20 feet deep. The westernmost adit is about 75 feet long. It is driven north and is overhand stoped 15 feet to the surface 25 feet from the portal. Several tens of feet east is another adit driven north 15 feet. The property was idle when visited but may be worked intermittently.

Production: Undetermined.

Reverences: None.

J.R.E. 1/27/60.

Figure 1/. Sketch map showing the location of
the Storm Sulfide (Green Giant - Long Green) deposit
(topography from U.S.A.C.E. 15' Eagle Tank quadrangle,
1943).

Temescal Rock Quarry

Location: S $\frac{1}{2}$ sec. 4, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 4 miles southeast of Corona, on the east side of Temescal Canyon.

Ownership: Minnesota Mining and Manufacturing Company, 900 Bush Avenue, St. Paul, Minnesota (P.O. Box 815, Corona 1) owns patented land in secs. 4, 5 and 9, T. 4 S., R. 6 W., S.B.M. totaling about 1,000 acres (1957).

History: Quarry was opened about 1888 to furnish rock for macadamizing streets in Los Angeles and nearby towns. By 1914 the quarry was owned and operated by the Temescal Rock Company whose plant had a capacity of 1,500 to 2,000 tons of crushed rock products per day. About 1920 the quarry was purchased by the Blue Diamond Materials Company who used the rock for building aggregate and road metal until 1927 when the plant was destroyed by fire. The property remained idle until 1947 when it was reopened by the present owner to produce roofing granules and has been in continuous operation since.

Geology: The quarry is in Temescal Wash Quartz Latite Porphyry, a fine-grained, dark-colored, intrusive rock of probable Jurassic age. The quartz latite is blue-gray on weathered surfaces and blue-black to gray on fresh fractures. The rock consists of abundant white feldspar and quartz phenocrysts in a gray microcrystalline groundmass. It has good breakage qualities and is very hard.

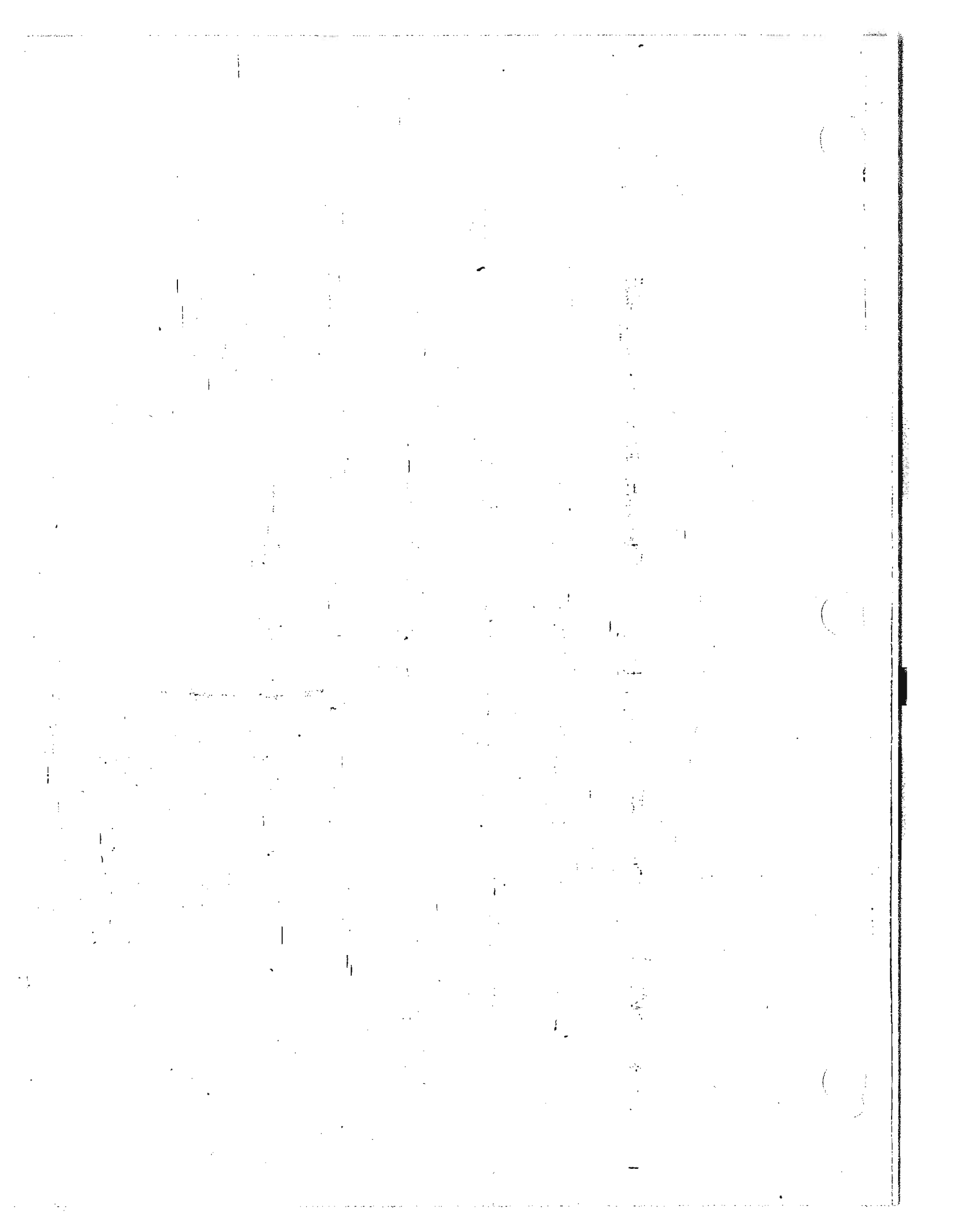
Development: The quarry face is steep and nearly 400 feet high on one bench level. Mining continues to widen the bench, which is about 1,000 feet long, on that face. In 1956 the length of the quarry, on the same bench, was extended about 900 feet to the south. The original north part of the quarry, however, continued to be the chief source of rock. Quarried rock is moved by belt conveyor to a processing plant in the canyon below the quarry. The function of the plant (described by Gray, 1961, p. 93-95) is twofold; first the material is crushed and screened into sizes suitable for various types of roofing granules and second, artificial colors are applied and bonded to the granules. Granules are produced in a variety of sizes and a wide range of colors. The major output is fine-grained material in the range 10 to 35 mesh used for processed roofing; additional but smaller amounts of coarse granules are produced for built-up roofing. During the 1950's these coarse granules were colored and bagged at a small plant on East Third Street, Corona, north of the city park, but about 1960 this plant was dismantled and the operation moved to a portion of the main plant in Temescal Canyon.

In addition to roofing granules this operation yields at least three by-products. Since 1956 reject material (-28 mesh) from the crushing operations has been used by several plants in sewer pipe manufacture. In 1963 Fontana Paving, Inc. erected an asphalt plant in Temescal Wash about one mile northwest of Temescal Rock Quarry from which quarry waste is used to make asphalt paving. The asphalt plant also utilizes decomposed Cajalco Quartz Monzonite and sandy alluvium from the east side of Temescal Wash adjacent to the plant. Also in 1963 Pomona Ready Mix Concrete erected a batch plant just west of the asphalt plant. Concrete gravel is supplied from the Temescal Rock Quarry and sand is mined from Temescal Wash adjacent to the plant.

Production: Initial capacity of the Temescal Canyon plant was about 100,000 tons of granules each year. This has been substantially increased and by 1963 was over 200,000 tons.

References: Goodyear, 1888, p. 506; Merrill, ¹⁹¹⁷[1919], p. 586-587; Tucker, 1921, p. 331-332; Tucker, 1924, p. 45; Allen, 1923, p. 887-890; Bradley, 1923, p. 95; Tucker and Sampson, 1929, p. 508, 524; Tucker and Sampson, 1945, p. 166-167; Ingram, 1949, p. 457; Utley, 1949, 5 p.; Megaphone, 1951, p. 6-7; Jahns, 1954, p. 21; Gray, 1961, p. 93-95.

C.H.G. 6/20/63.



Decomposed Granite

Decomposed, crystalline, igneous rock commonly called decomposed granite or D.G. is widely available in western Riverside County in areas underlain by the rocks of the Southern California Batholith. Such material is favored for road base work because it compacts well, yet remains permeable; characteristics not generally found in sand or soil.

Contractors seeking sources of D.G. must generally contact local land owners and it is usually agreed that pit sites will be left in a graded and orderly condition.

During 1961 the following firms were reported producers of decomposed granite in Riverside County:

Name	Address
Corona Dee Gee Co.	Corona
Gilbert A. Morris Excavating Co.	P.O. Box 194, Idyllwild
Riley Materials Co.	6740 Pedley Rd., Arlington

At nearby locations in San Bernardino County:

Name	Address
Hubbs Bros. Trucking	21674 Deberry Grand Terrace, Colton
V. L. Keller	12862 15th St., Chino

Unknown Pit

Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 4, T. 5 S., R. 6 W., S.B.M., Corona South quadrangle 7 $\frac{1}{2}$ ', 1954; northeastern flank of the Santa Ana Mountains, about 8 miles southeast of Corona, on a ridge midway between Bixby and Anderson Canyons.

Ownership: Alfred H. and Sue M. Beazley, 601 Fern Drive, Fullerton, own patented ranch land in this area (1957).

History: Pit opened during 1956. Idle 1957.

Geology: Brownish-gray, soft, much weathered biotite quartz diorite (phase of the San Marcos Gabbro). Largely altered to clay minerals, breaks into very fine-grained material.

Development: Shallow bulldozer cut.

Production: Small amount scraped from ridge in 1956, probably used locally by ranchers to surface unpaved roads.

References: Gray, 1961, p. 118.

C.H.G. 3/6/61.

Unknown Pit

Location: NE¹/₄NW¹/₄ sec. 9, T. 4 S., R. 6 W., S.B.M.,
Corona South quadrangle, 7¹/₂', 1954: northwest of El
Cerrito Village and about 3¹/₂ miles southeast of Corona.

Ownership: Minnesota Mining and Manufacturing Company,
900 Bush Avenue, St. Paul, Minnesota (P.O. Box 276,
Corona) (1957).

History: Undetermined. Idle 1957.

Geology: Light brownish-gray, soft, weathered quartz
monzonite (Home Gardens Quartz Monzonite Porphyry) with
minor hard, light gray blocks.

Development: Two small, nearly connected quarries
totaling about 100 feet in length with face from 10 to
25 feet high. Mined by power shovel without blasting.

Production: Small intermittent production, probably
used locally to surface unpaved roads.

References: Gray, 1961, p. 118.

C.H.G. 3/6/61.

Salt

Salt

Sodium chloride (NaCl), commonly known as salt, is no longer produced in Riverside County.

The first attempt to collect and market salt in the area now included in the county was that of the New Liverpool Salt Company. In 1884 this company began work harvesting a natural layer of salt, ranging from 10 to 20 inches in thickness, which had formed on the then dry surface of the "Salton Sea". The plant was located at Salton, a station on the Southern Pacific Railroad near the northeast margin of the playa surface. The following quote from Bailey (1902, p. 124) outlines the methods and working conditions of the enterprise.

"The sight at the salt works is an interesting one, for thousands of tons are piled up like huge snow drifts, and a large force of men is busy in preparing and packing, ready for market, salt of all grades and kinds. The workmen are Indians, belonging to the Coahuilla tribe, and are large, well-developed men, who are not affected by the dazzling sunlight, and who are able to work ten hours a day with the thermometer registering 150° in the sun. The Indians operate cable plows, that cut salt furrows 8 feet wide and 6 inches deep, each plow harvesting over 700 tons of pure salt per day. A portable railroad conveys the salt to the works."

This operation continued until the flood of 1905-1907 left the plant under 60 feet of water (Brown, 1923, p. 11-12, pl. 4; Ver Planck, 1957, p. 115).

A later attempt to win salt from this basin was made in 1927 by Seth Hartley who experimented with solar evaporation near Caleb at the north end of the sea. A crop of 1,500 tons was harvested in 1929 (Tucker and Sampson, 1929, p. 526) but no further activity was reported (Ver Planck, 1957, p. 115).

The two other desert basins in Riverside County, Palen Dry Lake and Ford Dry Lake northeast and east of Desert Center, do not appear to contain extensive deposits of evaporites although some well water in that area is strongly charged with dissolved mineral matter.

Decomposed Granite

Geology: Hemet Butte is composed of deeply weathered granitic rock of Cretaceous age. About half way up its west slope a dike is exposed which is as much as 40 feet wide. It strikes N. 25° W., dips 70° SW. and is traceable for about 1,000 feet. The dike ends abruptly at its northwestmost exposure where it attains its maximum thickness. It tapers gradually to the southeast. It is composed primarily of massive quartz but there are local concentrations of biotite and feldspar. Tucker and Sampson reported (1929, p. 504) that the silica is second-grade because of its iron content. The glass and ceramics industries consider iron-bearing minerals chemical impurities because of undesirable coloring they cause in finished products.

Development: Development consists of an open pit about 60 feet wide, 100 feet long, and 40 feet deep; and an adit which enters the slope about 50 vertical feet below the pit and is driven 100 feet N. 60° E. to a point on the footwall of the dike just below the pit. In addition, the southwest wall of the pit is breached by a narrow cut which apparently afforded access.

Production: Undetermined.

References: Waring, 1919, p. 16; Tucker and Sampson, 1929, p. 504-505; Sampson and Tucker, 1931, p. 443.

R.B.S. 7/23/58.

Lang Silica Deposit

Location: S $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 7, T. 8 S., R. 2 E., S.B.M.,
Aguanga quadrangle, 7 $\frac{1}{2}$ ', 1954; on the south side of a low
bouldery ridge and about 1,000 feet south of Coahuila
Road, approximately 4 $\frac{1}{4}$ miles northeast of Aguanga.

Ownership: Undetermined (1958).

History: The property was described briefly by
Tucker and Sampson (1929, p. 505). The owner was J. S.
Lang, Aguanga.

Geology: The deposit is a poorly exposed pegmatite
dike surrounded by deeply weathered granitic rock. The
dike strikes N. 20° W., is vertical, and is 10 - 30 feet
thick. Its outcrop is about 200 feet long. It is
composed of a coarse intergrowth of feldspar and milky
quartz with scattered biotite crystals. The feldspar
was reported to be 10 - 11 percent K₂O and the silica
of good grade (Tucker and Sampson, 1929, p. 505).

Development: The dike has been opened by 2 open pits;
one 20 feet wide, 40 feet long and 12 feet deep, the
other, about 50 feet southeast, is 6 feet wide, 12 feet
long and about 5 feet deep.

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 505.

R.B.S. 7/24/58.

Nettleton Deposit

This report is based largely on information contained in a recently published description by Engel, Gay, and Rogers (1959, p. 99-100).

Location: Sec. 14, T. 6 S., R. 4 W., S.B.M., U. S. Army Corps of Engineers Lake Elsinore quadrangle, 15', 1942; on the north and east side of a prominent hill about 4 miles southeast of Elsinore and about 1 2/3 miles south of Railroad Canyon dam.

Ownership: M. G. Nettleton, Temecula, holds patent.

History: The deposit has been inactive since about 1930 when an undetermined tonnage of quartz was quarried for unspecified purposes.

Geology: A body of aplitic and pegmatitic leucogranitic rock within granodiorite contains pods of milk-white quartz, and an unoutlined mass of quartz-sericite rock.

The quartz occurs as an irregular vein-like body, or bodies, in a discontinuously exposed zone that strikes about N. 45° E. and dips steeply southeastward to vertical. As exposed in workings near the top of the hill the zone is 20 to 30 feet wide and at least 300 feet long. Adits several hundred feet farther northwest may reach extensions of the zone underground but quartz is not exposed on the surface. Exposures indicate that individual lenses or pods in the zone are as large as 6 feet wide and 15 feet long, although larger masses may have been removed.

The quartz-bearing zone is much shattered and sheared. Bodies of pure quartz are separated by impure gougy material containing ground quartz, feldspar, mica, chlorite, and iron oxides. Small segregations of muscovite crystals, some nearly a half inch across, and a few thin quartz-orthoclase-muscovite veins are present. The quartz zone is faulted cleanly against leucogranite to the south. The fault strikes N. 35° E. and dips 60° NW.

About 300 yards eastward on the same hill a body of soft, fine-grained, quartz-sericite rock occurs, also within deeply weathered leucogranitic rock. As exposed underground, the quartz-sericite rock appears to be mainly confined to a 15-foot wide belt associated with a fault zone that trends N. 15° E. and dips 75° NW.

Development: The main opening is a large sidehill open cut at the southwestern end of the exposure near the top of the hill. This pit is about 30 feet wide and 50 feet long, with a face as high as 40 feet. It was mined in part as a glory hole. An irregular inclined opening, about 8 by 10 feet in plan, leads from the quarry floor through the quartz-bearing zone 50 feet down to a 100-foot haulage adit. A cable-drawn rail tramway was used to move the quartz about 150 yards down the hill to a loading point. Caved portals and substantial dumps at the loading point indicate level workings of undetermined length or purpose.

The eastern quartz-sericite body is explored by a 100-foot crosscut adit driven N. 55° W. through the shattered zone with a 40-foot winze 75 feet from the portal. A 15-foot caved pit exposes the quartz-muscovite rock 50 feet uphill from the adit portal. No stoping was done.

Production: Undetermined.

References: Engel and others, 1959, p. 99-100.

Nuevo

See: Southern Pacific Deposit.

Perris Mining Co. (Blom Mine) Deposit

Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 16, T. 6 S., R. 3 W., S.B.M.,
Romoland quadrangle 7 $\frac{1}{2}$ ', 1953; just north of Bundy
Canyon Road, half a mile west of Murrieta Road.

Ownership: J. B. "Tall" Turley, P.O. Box 608, Perris.

History: According to the present owner this mine is
known locally as the old Blom Mine. It was worked, from
the World War I period to about 1929, by Ollie Blom. The
product was trucked to Ellis R. R. Siding near Perris for
shipment to Washington Iron Works in Los Angeles for use
in the manufacture of porcelain and tile.

Geology: The weathered, diorite country rock is cut
by a quartz- feldspar pegmatite dike as much as 30 feet
wide which strikes N. 65° E. and dips 40° SE. The dike
is exposed for roughly 100 feet on the north slope of a
low knoll.

Massive quartz makes up most of the deposit.
Feldspar however, is reported to occur in masses as
much as 20 feet in thickness (Tucker and Sampson, 1929,
p. 506).

Development: When visited in 1959 the mine was flooded.
Consequently, the following description is drawn from
Tucker and Sampson (1929, p. 506).

The dike was explored by an inclined shaft driven S. 15° E. for a slope distance of 150 feet. An 80-foot shaft was sunk 50 feet west of the inclined shaft and the two are connected at the 50-foot level by a stope which is open to the surface. A 50-foot drift was driven northwest at the 75-foot level of the inclined shaft. In the face of an open cut about 15 feet deep, 50 feet west of the vertical shaft, an exploratory adit was driven 500 feet east but nothing of value was found.

The products were milled and graded at the mine but the equipment has since been removed.

Production: Undetermined. ~~1918-1969~~.

References: Tucker and Sampson, 1929, p. 506; 1945, pl. 35.

R.B.S. 9/22/59.

Southern Pacific Deposit

^{1/4}
Location: NW¹/₄ NE¹/₄ sec. 31, T. 4 S., R. 2 W., S.B.M.,
-Lakeview quadrangle, 7¹/₂', 1953; about 1¹/₂ miles southeast
of Nuevo.

Ownership: Gladding McBean & Co., 2901 Los Feliz^{Blvd.}
³⁹
Los Angeles.

History: This quarry was worked for feldspar and
silica, during 1916, 1917, and 1918, by the West Coast Tile
Company, apparently under lease from the Southern Pacific
Railroad, and at an unspecified later date the property
was purchased from the railroad by ^{the} American Encaustic
Tiling Company and worked by that firm for an unreported
period (Tucker and Sampson, 1929, p. 503). In 1929 the
property was reported (Tucker and Sampson, p. 503) as
"formerly operated" by the latter company and "presumably
exhausted".

Geology: A funnel-shaped mass of quartz-feldspar rich
pegmatite ^{is} exposed ^{over} ~~in~~ an area 130 feet long and 110 feet
wide, in quartz-hornblende diorite. The longer dimension
strikes N. 40° E. This deposit comprises three distinct,
roughly-concentric zones. The outer zone is composed of
quartz and feldspar intergrown to a considerable extent
as graphic granite. On the southeast side of the quarry
the outer zone contains radiating groups of lath-shaped
biotite crystals; individual clusters 20 inches in diameter

are common. The intermediate zone is a coarse-grained mixture of quartz, feldspar, and black tourmaline. The feldspar was reported to contain 11 percent potash (Tucker and Sampson, 1929, p. 503). The central zone, composed of massive quartz, is now largely removed, the remaining portion being the apex of what was once a cone-shaped mass.

Development: In developing this deposit advantage was taken of its position in the crest of a low ridge. The quartz-feldspar body was explored by an open pit about 40 feet deep and roughly 100 feet in diameter. Additional access was by means of 3 cuts and 2 short adits in the surrounding slopes. (fig. ___/).

Production: Undetermined.

References: Tucker and Sampson, 1929, p. 503; Jahns, R. H., 1954, p. 42, fig. 7.

R.B.S. 10/22/58

Tully Deposit

Location: E $\frac{1}{2}$ sec. 32, T. 4 S., R. 2 W., S.B.M.,
Lakeview quadrangle, 1953; about 3 miles southeast of
Nuevo and northwest of Juniper Flat.

Ownership: Undetermined, 1958.

History: This deposit probably was worked in the
1920's. By 1929 the mine was idle (Tucker and Sampson,
1929, p. 507) and appears to have remained so since.

Geology: Several north- to northwest-trending
pegmatite dikes are exposed along low knolls and
ridges of diorite. The dikes which were mined are
confined to the NE $\frac{1}{4}$ of the section. These deposits
appear to be as much as 30 feet wide but their
boundaries are obscured by brush and regolith. To
the southwest, in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of the section a
north-trending, westward-dipping dike as much as 30
feet wide is exposed for about 1,000 feet. Black
tourmaline and garnets are common in this body.

Development: The northeast dikes were explored
by shallow pits and trenches along the outcrop. The
southwest dike was opened by 2 small prospect pits,
~~but apparently was not seriously mined.~~

Production: By 1929 this deposit had yielded at least 2,500 tons of feldspar which was shipped to Riverside Portland Cement Company. (Tucker and Sampson, 1929, p. 507). ~~1919.~~

References: Tucker and Sampson, 1929, p. 507; 1931, p. 425; 1945, pl. 35; Sampson, R. J., 1935, p. 521.
R.B.S. 10/21/58.

Williamson Mine

See Coahuila Brave Mine.

White Prince (Yellow Queen) Deposit
~~Gavilan Deposit~~

Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T. 4 S., R. 5 W., S.B.M.,
Steel Peak quadrangle 7.5; 1953. The deposit forms a
low knoll on the north side of Santa Rosa Road.

Ownership: Undetermined.

History: Undetermined.

Geology: A body of quartz-feldspar pegmatite, lenticular in plan and as much as 60 feet wide, is exposed for a horizontal distance of 100 feet. It strikes N. 15° W. and dips 40° SW. The country rock is diorite. Translucent, massive quartz and contained irregular masses of microcline comprise most of the dike. The body also contains sparsely distributed crystals of biotite mica as well as local concentrations of a friable, black mineral. The dike has been sheared. The quartz appears to have been more ^{highly sheared} affected than the feldspar, and the resulting zones of fractures are iron stained.

Development: The deposit has been opened by a single open cut which breaches the northwest slope of the knoll and occupies most of the outcrop area.

Production: Undetermined. ~~1959~~.

References: None.

R.B.S. 9/24/59.

Yellow Queen

See: White Prince Deposit.

*specimen for
Silica Sand*

Corona Silica Sand Deposit (Owens-Illinois Glass Co.,
Corona Sand Plant No. 96; P. H. Weisel Industrial Sand Co.)

Location: NE $\frac{1}{4}$ sec. 21; SE $\frac{1}{4}$ sec. 16, T. 4 S., R. 6 W.,
S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; 6 road miles
southeast of Corona athwart State Highway 71 on west side
of Temescal Wash.

Ownership: Louis A. Weisel, et al., La Habra, own
about 550 acres of patented land in secs. 15, 16, 21 and
22, T. 4 S., R. 6 W., S.B.M. The Owens-Illinois Glass
Company, 330 Sansome Street, San Francisco (P.O. Box 298,
Corona) holds under lease about 140 acres in secs. 16
and 21 (1957).

History: The Corona silica sand deposit is the oldest
continuously operated source of silica sand in southern
California and continues to be the principal source.
The deposit was opened and developed in the early 1920's
by the P. J. Weisel Industrial Sand Company who operated
the plant until 1945 when it and the deposit were taken
over by the Owens-Illinois Glass Company. A new and much
larger plant was erected in 1947 near the site of the old
plant which was dismantled. The new plant began pro-
duction in 1948 and has since been in continuous operation.

Geology: Sand is obtained from a quartz-rich facies in the lower part of the Paleocene Silverado Formation and is apparently non-marine. The deposit consists of gently dipping, thinly bedded and locally cross-bedded white sandstone. Where exposed in the active pit west of the highway and in the old quarry face east of the highway, the usable sandstone is about 120 feet thick. In the mine area the Silverado Formation is exposed over an irregularly shaped rectangular area about 2,000 feet wide and 3,000 feet long. The sandstone is covered by overburden ranging from several feet of older alluvium in low-lying areas, to 20 feet or more of Quaternary terrace gravels, which cap the deposit unconformably on several low hilltops. The sandstone is coarse-grained to pebbly and is weakly cemented by clay and contains lenses of gray or grayish-green silt and sandy clay. The sand size particles are almost wholly angular to subangular quartz grains, and the pebbles, which are rounded, are of quartz and feldspar. Abundant pearly gray to black flakes of mica commonly give the sand a distinctive schistose appearance. About 30 to 40 percent of the deposit is clay, silt, and fine sand (-200 mesh); 60 to 70 percent is sand and small pebble sized (+200 mesh to $\frac{1}{4}$ -inch); and generally less than 10 percent is large pebbles ($\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch).

Development: Inactive quarry east of the highway is 600 feet long and 600 feet wide with face about 120 feet high. The active open pit is west of the highway. In 1956 this pit was crudely triangular in plan, and had dimensions of about 300 feet by 450 feet by 700 feet and a maximum depth of about 120 feet. Since 1956 overburden has been stripped from a large area about 1,250 feet by 800 feet in plan adjoining the north edge of the pit and present mining is in this north extension of the pit. Both the mining operation and the processing plant have been described by Gray (1961, p. 97-101). The function of the plant is to remove clay and iron-bearing constituents from the sand and to produce high grade silica sand suitable for use in the manufacture of glass. Two grades of sand are produced: "flint" sand (Fe_2O_3 content 0.03% to 0.035%) which is used to make colorless glass, and "amber" sand (Fe_2O_3 content 0.04% to 0.10%) which is used in the manufacture of amber- and green-colored glass containers. Waste pond material contains a large proportion of clay. After settling this material is sold to a number of companies for use as a constituent in the manufacture of common clay products.

(c) 119

Production: Initial capacity of the plant in 1948 was 90 tons per hour of crude sand with output of about 30 tons of finished flint sand and 15 tons of amber sand per hour. In recent years production has been at the rate of about 20,000 tons per month. The product is shipped to the Los Angeles area.

References: Tucker and Sampson, 1929, p. 504; Tucker and Sampson, 1945, p. 163-164; Gray, 1961, p. 97-101, 119.

C.H.G. 6/20/63.

Glass Sand

Coronita Ranch Sand Deposit

Location: SW $\frac{1}{4}$ sec. 16, E $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 17, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; 6 $\frac{1}{2}$ road miles southeast of Corona along the east margin of lower Bedford Wash a quarter of a mile west of State Highway 71.

Ownership: Coronita Ranch, Joel D. Middleton, 9531 Heather Road, Beverly Hills, and Donald C. McMillan, 8704 Colima Road, Whittier, own 240 acres of patented ranch land.

History: This property was first explored for glass sand in April 1957, when 10 drill holes were put down in the SW $\frac{1}{4}$ sec. 16 along the southeast margin of and east of Bedford Wash. The work was under the direction of Mr. Meredith C. Brown. Early in 1958 the property was taken under option by the Del Monte Properties Company, Pacific Grove, who did additional drilling and sampling in this area and also on other parts of the Coronita Ranch in secs. 17, 18, 19, and 20, T. 4 S., R. 6 W., S.B.M. Although beneficiation tests and analyses of samples indicate that the sand is probably of glass grade (Brown, 1957) the deposit has not been mined.

Geology: The Coronita Ranch sand deposit adjoins the west edge of the Corona silica sand deposit (described elsewhere in this report) and apparently is the northwest extension of the same sequence of Silverado Formation sandstones and clayey sandstones which have been mined for many years. On the Coronita Ranch property the Silverado sandstone crops out in one small exposure on the east bluff of Bedford Wash. Here it strikes N. 45° W. and dips 8° to 10° SW. The remainder of the property is covered mostly by older alluvium, but one small hill is capped by terrace deposits. Low hills, which rise along the south margin of the property east of Bedford Wash, are underlain by the Sespe and Vaqueros formations. Five drill holes, ranging from 26 to 90 feet in depth, encountered overburden only; five other drill holes encountered medium- to coarse-grained Silverado sandstone, siltstone, and sandy clay with abundant greenish-gray mica. These holes all bottomed in this formation at 90 feet, with overburden ranging from 2 to 24 feet.

Development: Drilling and sampling only.

Production: None.

References: Brown, 1957, 8 p.; Gray, 1961, p. 101-103, 119.

C.H.G. 8/22/62.

(Glass sand)

Findley Feldspar Placer

See: Findley Feldspar placer under clay.

Hoag Ranch Sand Deposit

See: Smith silica pit.

spec. 117, 118 as
(clean sand)

Owens-Illinois Glass Company, Corona Sand Plant No. 96

See: Corona silica sand deposit.

Jones Sand Deposit

See: Smith silica pit.

White Sand

Smith Silica Pit (Jones, Hoag Ranch, Sand Deposit)

Location: SW $\frac{1}{4}$ sec. 17, T. 4 S., R. 6 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; about 4 miles south-
east of Corona, between Bedford and Joseph Canyons.

Ownership: Riverside Cement Company Division of the
American Cement Corporation, P.O. Box 832, Riverside, owns
80 acres of patented ranch land.

History: The Jones deposit, on the old Hoag Ranch, was
owned in 1925 by A. E. Jones of Corona who did some open
cut development work and erected a wooden loading bin.
Apparently there was little or no production of glass
sand from this property, but small amounts of sand may
have been produced and used as foundry sand in the 1920's.
In 1958 the property was acquired by the Riverside Cement
Company who did extensive drilling and sampling. Early
in 1961 the property was put into production as a source
of white silica sand for use in the manufacture of white
portland cement at the company's new white plant at Crest-
more.

Geology: The deposit is composed of generally massive, poorly consolidated, white sandstone which is locally conglomeratic. It is probably of Pliocene age. Indistinct bedding appears to strike northwestward and dip about 20° southeast. The sandstone consists mostly of quartz and feldspar. In places the unconsolidated sand contains very little mica and has no visible impurities, elsewhere it contains much mica, occasional sandy clay layers, clay shale clasts, and cobbles of granitic volcanic, and meta-sedimentary rock. The mixed sandstone and conglomeratic sandstone is exposed over an area about 1,000 feet square. An overburden, 5 to 10 feet thick, of older alluvium covers the central and southern part. Tucker and Sampson (1929, p. 505) state that the raw material was reported to contain 97.45 percent silica and was upgraded to 97.54 percent silica after washing and screening and that the iron content ranged from 0.09 percent to 0.11 percent.

Development: The property has undergone extensive drilling and sampling. Mining is from a side hill open cut about 300 feet long and 200 feet wide with face 10 feet high. Mining is done by tournapull equipment and bulldozer, which in a period of several days mines about one year's supply of sand. The sand is hauled by truck-trailer equipment to Crestmore.

Jackson and Havens Deposit

Location: Undetermined, probably in the SW $\frac{1}{4}$ sec. 11(?) T. 4 S., R. 7 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern margin of the Santa Ana Mountains, 3 miles southwest of Corona, midway between Main Street and Hagador Canyons.

Ownership: George W. Lord, Corona (1924); undetermined (1961).

History: Reported under development in 1924 by Jackson and Havens, Riverside; this deposit, discovered in 1917, was worked intermittently prior to 1924, but apparently not since. During 1922 sand was shipped to the Union Tool Company, Los Angeles. By 1956 all equipment had been removed.

Geology: A bed of white "molding" sand about 30 feet thick composed of coarse, white sub-angular arkose (Paleocene Silverado Formation?) overlain by about 2 feet of gravel and soil overburden (Quaternary terrace deposit?) was reported under development by Jackson and Havens in 1924.

Development: The deposit was worked by open cuts, the material being loaded into small mine cars and transported to loading bins.

Production: Undetermined but apparently small.

References: Gray, 1961, p. 120.

C.H.G. 3/7/61.

Nonhof Deposit

Location: NW $\frac{1}{4}$ sec. 10, T. 4 S., R. 7 W., S.B.M.,
Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; northeastern margin
of the Santa Ana Mountains, 3 miles southwest of Corona,
west side of lower Hagador Canyon.

Ownership: Arthur Weirick, Chase & Skyline Drive,
Corona (1956).

History: This deposit, discovered in 1900, is reported
to have been productive before 1907 (personal communi-
cation, Mrs. Irene J. Ware, Corona) and may be one of
the glass sand deposits noted by Aubury (1906, p. 375)
as under development by the Corona Pressed Brick Company
about 1905. In 1956, the workings were not identifiable
and may have been destroyed by work at the adjacent
McKnight clay mine. Long idle.

Geology: In 1924, Mr. Nonhof reported a bedded deposit
of sand, 50 feet thick, in unconsolidated sands, gravels,
and clays (of Paleocene Silverado Formation). Sand
deposit covered about 2 acres with a 5-foot thick over-
burden of gravel and soil (Quaternary terrace deposit).

Development: Consisted of open cuts and one 50-foot
adit in 1924.

Production: Undetermined, but probably small.

References: Aubury, 1906, p. 375; Gray, 1961, p. 120.

C.H.G.

foundry sand
(foundry sand)

Nonhof Deposit

See: Nonhof deposit under foundry sand.

Glass Sand

Temescal Canyon Silica Sand Deposit

Location: NE $\frac{1}{4}$ sec. 29, T. 4 S., R. 6 W., S.B.M., Corona South quadrangle, 7 $\frac{1}{2}$ ', 1954; 5 miles southeast of Corona, southeast of Bedford Motorway, and north of McBride Canyon.

Ownership: Arthur E. Garratt, 3340 Eastern Avenue, Los Angeles 32, owns sec. 29, formerly railroad land (1957).

History: Area prospected for glass sand years ago (probably in the 1920's) by means of several shallow pits from which a small production may have been obtained. Early in 1956 the Ottawa Silica Company, Ottawa Illinois took the property under option and explored in this area and also in the W $\frac{1}{2}$ sec. 28. The property was not put into production.

Geology: Coarse, weakly indurated, white arkose of probable upper Eocene to lower Miocene age (undifferentiated Vaqueros and Sespe formations) crops out over much of the N $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 29, but the flat topped ridges in this area are capped by Quaternary terrace gravels. South of these exposures is a fault sliver of Paleocene Silverado Formation, composed of sandstone, clayey sandstone, and clay, which crops out along the northeast side of the Elsinore fault and extends from McBride Canyon northwest along the margin of the Santa Ana Mountains. The fault sliver is about 600 feet wide and 2,000 feet long.

Development: Eight 18-inch diameter drill holes were put down in the NE $\frac{1}{4}$ sec. 29 in 1956 and the remainder of the area was explored by numerous bulldozer cuts and trenches.

Production: Undetermined, probably none.

References: Sampson and Tucker, 1931, p. 444; Gray, 1961, p. 103, 119.

C.H.G. 8/24/62.

Production: Since mid 1961, about 10,000 to 15,000 tons each year.

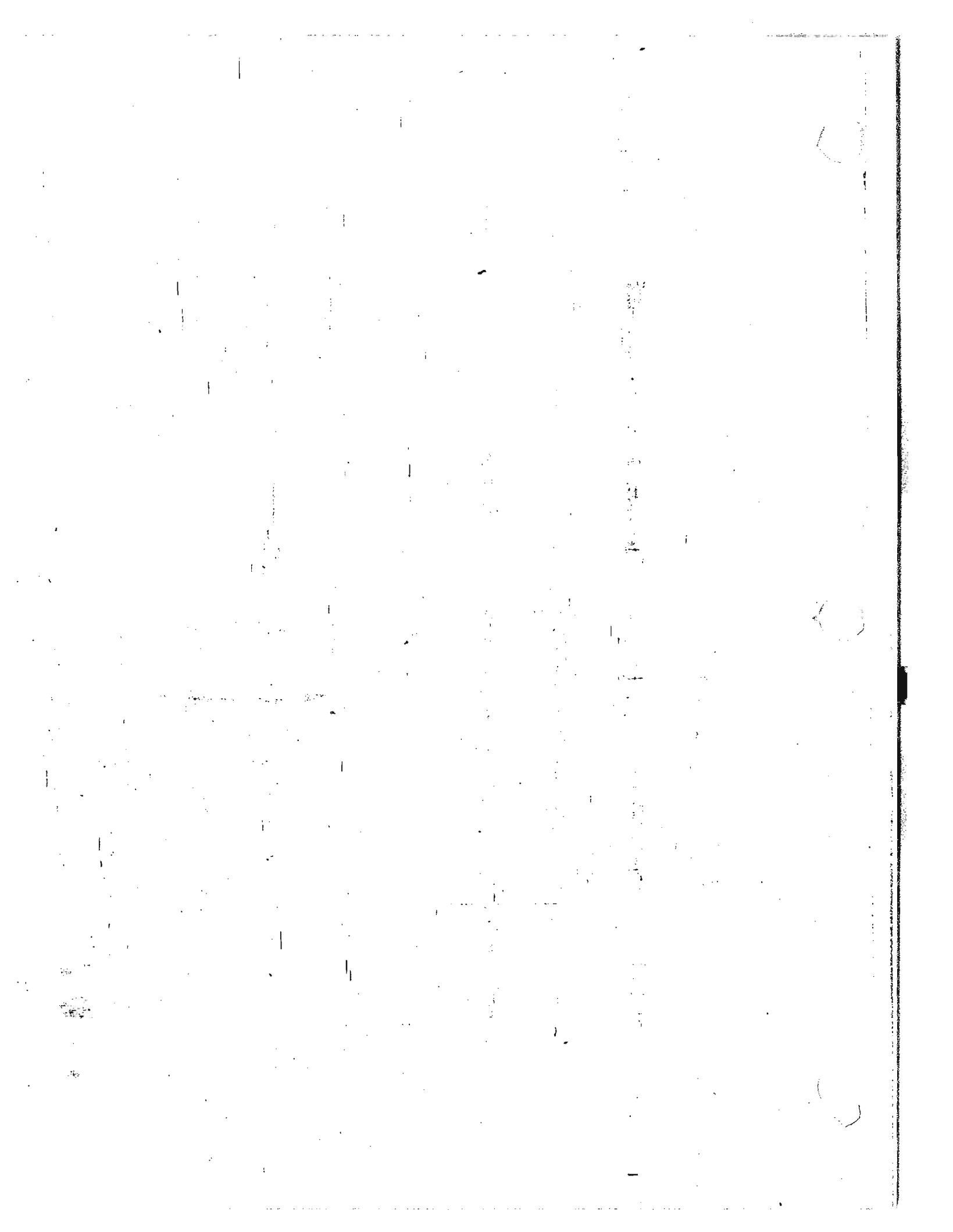
References: Tucker and Sampson, 1929, p. 505; Sampson and Tucker, 1931, p. 443; Tucker and Sampson, 1945, p. 163; Gray, 1961, p. 103, 119.

C.H.G. 6/20/63.

Specialty sand
(Glan sand)

P. J. Weisel Industrial Sand Company

See: Corona silica sand deposit.



Talc

Palen Mountains Talc Deposit

Location: Sec. 18 (proj.), T. 5 S., R. 18 E., S.B.M., Sidewinder Well quadrangle, 1952; 15 miles northeast of Desert Center at the southwest edge of the Palen Mountains.

Ownership: ^{un}Not determined (1959).

History: In 1945 this property was held by E. T. Herman, El Segundo, and Leslie C. Mott, Los Angeles (Tucker and Sampson, 1945, p. 182). It was idle then and when visited in March, 1959.

Geology: The area of the deposit is underlain by metasedimentary rocks of the McCoy Mountains formation (Miller, 1944, p. 32). A shear zone as wide as 60 feet strikes N. 70° W. across the north slope of a steep ridge and dips 70° SW. It is traceable for approximately three-quarters of a mile between its faulted southeast end and the alluvium to the northwest. The shear zone comprises irregular masses of talcose schist and friable, white talc. The following analysis, submitted by the owners (1945), appeared in a previous report (Tucker and Sampson, 1945, p. 182).

	Percent
Silica (SiO_2) -----	60.70
Iron and aluminum oxides (Fe_2O_3 and Al_2O_3) ---	1.95
Calcium oxide (CaO) -----	trace
Magnesium oxide (MgO) -----	30.88
Water (H_2O) -----	4.50

Development: The principal development is at the east end of the outcrop. It consists of shallow open cuts and a 30-foot crosscut driven from the footwall through solid talc. About 10 feet from the face of the crosscut there is a 10-foot winze.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 182, pl. 35.

R.B.S. 3/12/59.

Tunnel Claim

Location: NE $\frac{1}{4}$ sec. 23, T. 7 S., R. 11 E., S.B.M., Orocopia Canyon quadrangle, 7.5', 1958; reached by an unimproved road which extends northward from a Coachella Canal siphon marked as the site of EM 67 on the topographic map.

Ownership: Undetermined.

History: Undetermined.

Geology: A shear zone, about 40 feet wide containing talcose, chlorite-actinolite schist crops out through a strike distance of about 500 feet on a steep slope cut in flaggy, quartz-biotite gneiss. The zone strikes N. 60° W., and dips 30° SW.

Development: The deposit is opened by several open-cuts; one in the canyon wall, the others higher on the slope to the northwest. The adit, shown on the topographic map, either never existed or is now covered.

Production: Undetermined.

References: None.

R.B.S. 2/26/60.

Tin

Tin

The first, and still the most important, reported discovery of tin in California was in the Temescal district, Riverside County, prior to the Civil War, probably in 1853 (Hanks, 1884, p. 120-122). Presumably the initial discovery was at Cajalco Hill (site of the Temescal or Cajalco mine). Exploration stopped with the outbreak of the Civil War, but was resumed in 1868, and in 1869 a 15.34 ton shipment of ore was made to San Francisco (Page and Thayer, 1945, p. 1). Subsequently ore was mined during 1891 and 1892 and later in 1928-29. During the early 1940's the U. S. Geological Survey examined the area and an open-file report was prepared (Page and Thayer, 1945, 24 p., 13 figs.), but the mines have remained idle. The total production of tin from Riverside County is estimated at about 130 long tons, all of which apparently came from the Temescal (Cajalco) mine.

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Figure 3. View east toward the area of exploration in the northwest part of section 23. The open cut sketched in fig. 2/ is in the center right.

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Caproni-Woock Groups

Location: SE $\frac{1}{4}$ sec. 13, SW $\frac{1}{4}$ sec. 14, (proj.), and N $\frac{1}{2}$ sec. 23, N $\frac{1}{2}$ sec. 24, T. 6 S., R. 20 E., S.B.M., McCoy Spring quadrangle, 1952; McCoy Mountains, about 17 miles west of Blythe on the south slope of McCoy Peak.

Ownership: N. A. Caproni, 510 N. 4th St., Blythe, owns the Real McCoy group of 29 unpatented claims, the Melody group of 15 unpatented claims, and the Kings Ransom group of 7 unpatented claims. N. A. Caproni and W. R. Woock, 339 E. Lockport St., Lodi, own the Royal Flush group of 155 unpatented claims (N. A. Caproni, oral communication, November 1958).

History: Undetermined.

Geology: Exploratory work is in fractured and jointed, west-trending metamorphic rocks which form the southern part of the McCoy Mountains. The metamorphic rocks, referred to by Miller (1944, p. 32) as the McCoy formation, are composed largely of gray to greenish-brown metaconglomerate, quartzite, schist and slate with some gray to white quartzite. They have been warped into a broad arch that plunges east. A thin veneer of black desert varnish coats the metaconglomerate and quartzite surfaces. Veins of milky quartz, ranging in thickness from 0 to 15 feet, crop out locally. Thin patches of drusy uranophane and autunite occur as coatings on some of the rock exposed by surface excavations, and at the fact of a 238-foot adit.

Development: Numerous open cuts and shallow prospect pits dot the south slope of McCoy Peak. An adit 238 feet long and 2 large open cuts are in the northwest part of section 23, midway up the south slope of a west-trending ridge (figs. 1/, 2/, and 3/). Another adit, 155 feet long, is in the northeast part of section 23 on the east slope of a south-trending ridge, about half a mile east of the previously mentioned adit (fig. 1/). The areas of exploration are accessible by fair and good dirt roads which join U. S. Highways 70 and 66 about 16 miles west of Blythe. The claims were not being worked in November 1958.

Production: N. A. Caproni reports that between early 1956 and mid-1958, 44 tons of ore, containing between 0.27 and 0.67 percent U_3O_8 were shipped to the A.E.C., in Denver, Colorado.

References: Miller, 1944, p. 32.

J.R.E. 11/13/58.

Figure 1. Sketch map of adits in the northwest
(1) and northeast (2) part of section 23, Caproni-
Woock uranium groups.

Northeast No. 1 Claim

Location: E $\frac{1}{2}$ W $\frac{1}{2}$ sec. 19, T. 6 S., R. 21 E., S.B.M., McCoy Spring quadrangle, 1952; about 2 miles north of U. S. 60-70 and 12 miles west of Blythe on the south margin of the McCoy Mountains.

Ownership: Joseph and Charles Safranek, 4219 Lennox Blvd., Lennox.

History: Undetermined.

Geology: This property lies along the east face of a narrow, north-northwest-trending ridge of sheared, meta-sedimentary rocks. A secondary, yellow, radioactive mineral resembling carnotite is unevenly distributed along shear zones in which it has impregnated porous material and formed thin crusts and fissure fillings. The deposit is exposed in an area several hundred feet long and about 100 feet wide. Its full extent and average grade was not determined when visited in October of 1960.

Development: The radioactive area has been opened by several bulldozer cuts but no systematic exploration appears to have been done.

Production: Undetermined.

References: Butler, Finch, and Twenhofel, 1962.

10-17-75

In 1963 Uranium ore shipments were reported in California for the first time since 1960. One was mined on the Safranek property in Riverside Co. from Metal Mining and Processing, May 1964 p. 62.

The Temescal (Cajalco) mine and several neighboring properties which together comprise the Temescal tin district are confined to an area of approximately 15 square miles about 5 miles southeast of Corona and 11 miles southwest of Riverside. Here a mass of quartz monzonite contains a group of tourmaline-quartz veins in only a few of which recoverable amounts of cassiterite have been found. Probably several hundred veins have been seriously explored in the Temescal district and numerous smaller stringers and tourmalinized zones also exist. The veins are commonly zoned or banded, but most of the veins that are a foot or less in width consist entirely of mottled tourmaline rock or silicified rock. In the wider parts of the veins, where mineralization was more intense, their centers are occupied by a layer of fine-grained tourmaline a few inches wide. The veins apparently replaced the quartz monzonite along fissures soon after it solidified. Assays indicate that almost all of the veins contain 0.03 to 0.1 percent tin, but samples assaying more than 0.1 percent have been collected in very few places. Cassiterite occurs as disseminations and as bunches and stringers in the tourmaline-quartz rocks (Page and Thayer, 1945, 24 p., 13 figs.).

In addition to the Temescal district traces of tin in Riverside County are reported in the Elsinore district, about 15 miles to the southeast. The area at the Chief of the Hills group (see herein) was prospected in the late 1920's but no tin was produced. In the mid-1930's prospectors sought tin in the hills a few miles east of Elsinore but little or none was found (Engel et al., 1959, p. 77).

American Flag and Monarch Mines*

Location: Reported to be "2 miles east of Elsinore", not identified in 1955. Reported to comprise 12 claims in 3 groups.

Ownership: Undetermined.

History: Area prospected for tin in the mid-1930's.

Geology: Triassic(?) slates and quartzites (Bedford Canyon Formation) and granitic rocks (Bonsall tonalite?) and basic dikes. No veins; "dikes" are mainly colored streaks in granitic rocks.

Development: Explored by at least 20 open cuts, pits, and shallow shafts. Six samples taken from places designated by former owners as carrying 22 to 80 lbs. tin per ton were found to contain less than 0.4 lb. tin per ton; less than 0.2 lb. nickel and 0.4 lb. cobalt.

Production: Apparently none.

References: Bedford and Johnson, 1946, p. 10; Engel et. al., 1959, p. 77, 126.

C.H.G. 8/7/62

* Adapted from Engel et al., 1959, p. 77, 126.

Black Rock (North Black Rocks) Deposit

Location: Secs. 18, 19, T. 4 S., R. 5 W., S.B.M., Lake Mathews quadrangle, 7½', 1953; 7½ miles southeast of Corona and half a mile south of Lake Mathews on both sides of Cajalco Road.

Ownership: In 1945 holdings comprised 400 acres owned by W. B. Moore, Moore Bros., 711 Baker Building, Walla Walla, Washington. Present (1962) extent of holdings and ownership not determined, but at least part of the area is owned by the Metropolitan Water District of Southern California, 306 West Third Street, Los Angeles, California.

History: The Black Rocks Tin Syndicate sampled about 40 veins in the NW¼ sec. 18 in 1927-29 by means of one inclined shaft and prospect pits on the veins (Page and Thayer, 1945, p. 23). The property has been idle since the 1930's.

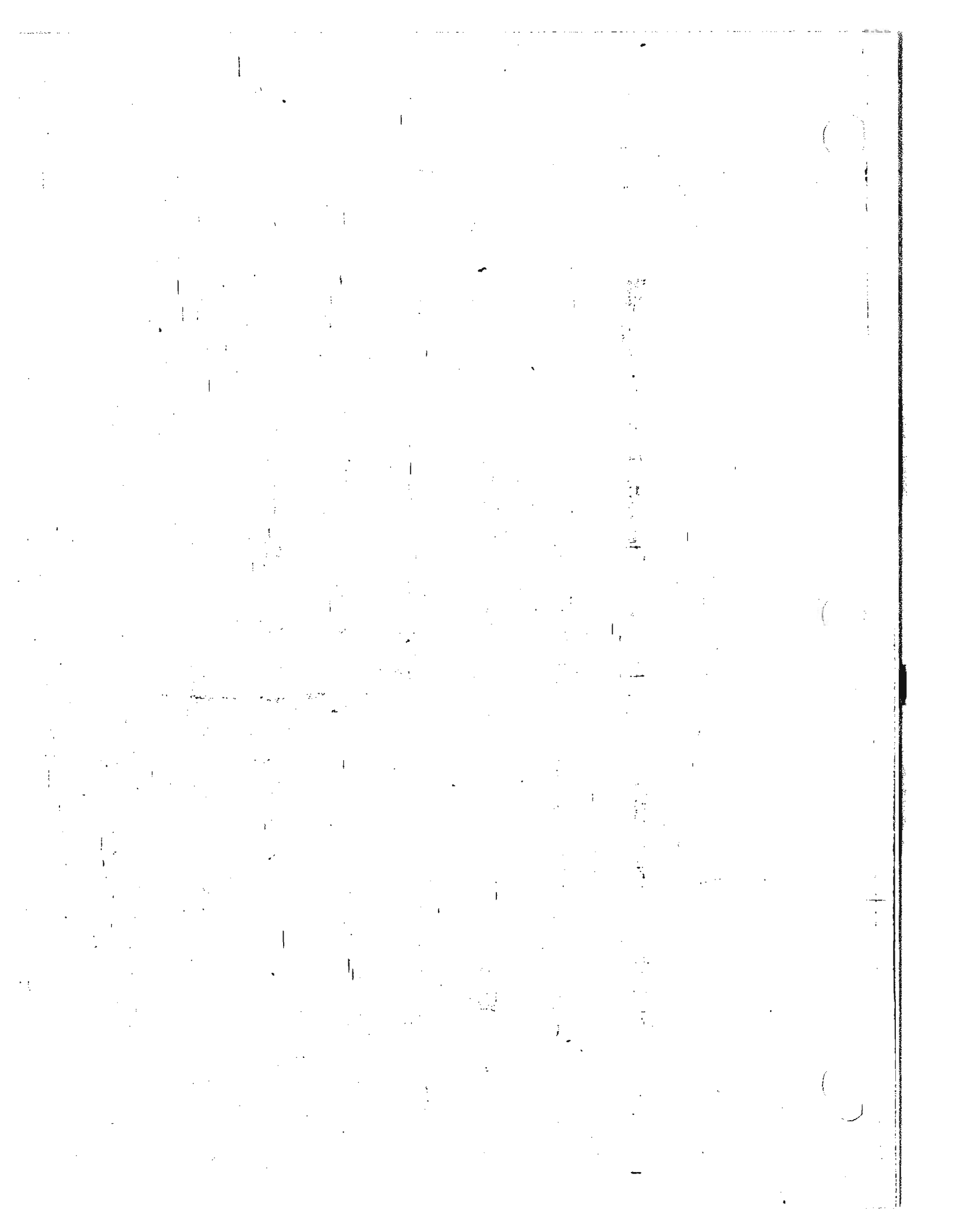
Geology: Tourmaline-quartz veins and pipes in quartz monzonite. Tucker and Sampson (1945, p. 151) reported twelve tourmaline veins striking northeast, dipping 60° SE., and ranging in width from 4 to 30 feet. According to Page and Thayer (1945, p. 24) about 310 samples were taken by the Black Rocks Tin Syndicate and only occasional assays showed more than 0.08 percent of tin, and the highest was 0.18 percent.

Development: One inclined shaft sunk to a depth of 125 feet (Tucker and Sampson, 1945, p. 151) and a few prospect pits.

Production: Undetermined, but apparently none.

References: Tucker and Sampson, 1929, p. 495-96; Sampson, 1935, p. 516; Tucker and Sampson, 1945, p. 151; Page and Thayer, 1945, 24 p., figs. 4, 6; Bedford and Johnson, 1946, p. 10; Gray, 1957, p. 643.

C.H.G. 8/10/62.



Chief of the Hills Group*

Location: NE $\frac{1}{4}$ sec. 4, NW $\frac{1}{4}$ sec. 3, T. 6 S., R. 4 W., S.B.M., Elsinore quadrangle 7 $\frac{1}{2}$ ', 1953; east side of high point on ridge one mile west of Railroad Canyon Dam, about 2 airline miles east of Elsinore.

Ownership: J. M. Mack, C. L. Berry, and Mary Briner, Elsinore (1926); public domain (1945); undetermined (1962).

History: Area prospected in the late 1920's and 5 claims were located in December 1926. By 1929 the property was idle and there is no report of renewed activity.

Geology: Country rock is Triassic(?) slate, quartzite, and metaconglomerate (Bedford Canyon Formation); beds strike N.5° to 20°W., dip 80°E. Comb quartz veins 2 to 3 inches wide on edge of metaconglomerate body; much discoloration by iron, manganese(?) oxides. Tin reported to occur as reddish brown crystals lining cavities in minutely crystalline tourmaline associated with 5 fine-grained granitic dikes (Tucker and Sampson, 1929, p. 496); tin minerals not found in 1954. Reported assays of 0.30 to 2.21 percent tin (Tucker and Sampson, 1929, p. 496), and 7 percent tin (Segerstrom, 1941, p. 551).

*Adapted from Engel et al.; 1959, p. 77, 126.

Development: Prospected by shallow trenches and 100-foot vertical shaft with crosscuts driven 20 feet east and 10 feet west at bottom. West crosscut reported driven in material that assayed 0.31 to 1.22 percent tin (Tucker and Sampson, 1929, p. 496). Shaft open but inaccessible in 1954, inhabited by owls.

Production: No production.

References: Tucker and Sampson, 1929, p. 496; Sampson, 1935, p. 516; Segerstrom, 1941, p. 551; Tucker and Sampson, 1945, p. 152, plate 35; Larsen, 1948, p. 133; Larsen, 1951, p. 49; Engel et al., 1959, p. 77, 126.

C.H.G. 8/7/62.

Holmes Ranch Deposit

Location: NW $\frac{1}{4}$ sec. 12, T. 4 S., R. 6 W., S.B.M., Lake Mathews quadrangle, 7 $\frac{1}{2}$ ', 1953; about 6 miles southeast of Corona and 1 $\frac{1}{2}$ miles southeast of Cajalco Hill, along Cajalco Canyon west, and adjacent to, Cajalco Dam and Spillway.

Ownership: In 1945 Tucker and Sampson (p. 152) reported the ranch consisted of 560 acres owned by Lawrence Holmes, Arlington, California. Ownership and extent of holdings was not determined in 1962.

History: Probably first prospected during the late 1800's, when the nearby Cajalco Mine was active. By 1929 (Tucker and Sampson, p. 496) the property was under option to Southern California Tin Corporation, but other than sampling no development work had been done on the vein. The area was included in studies made by the U.S. Geological Survey in the 1940's (Page and Thayer, 1945, 24 p. 13 figs.) but has remained idle.

Geology: A group of tourmaline veins in quartz monzonite occur in the SW $\frac{1}{4}$ sec. 1 and the NW $\frac{1}{4}$ sec. 12. The veins trend about N. 20°E. and most dip 50° to 80° NW., but a few dip 60° to 65° SE. Fifteen samples contained only traces of cassiterite (Page and Thayer, 1945, p.23). Tucker and Sampson (1945, p. 152) reported the vein outcrop to be from 6 to 15 feet in width.

Development: Two shafts of undetermined extent are on either side of Cajalco Canyon, but apparently not on tourmaline veins. These two shafts are said to have been sunk during construction work at Cajalco Dam during the 1930's. The veins have been explored by means of several trenches and pits.

Production: Undetermined, apparently none.

References: Tucker and Sampson, 1929, p. 496; Sampson, 1935, p. 516; Tucker and Sampson, 1945, p. 152; Page and Thayer, 1945, 24 p. 13 figs.; Bedford and Johnson, 1946, p. 9.

C.H.G. 8/10/62

Moore Deposit

Location: Secs. 13, 14, 23, 24, T. 4 S., R. 6 W., S.B.M., Lake Mathews quadrangle, 7½', 1953; about 7 miles southeast of Corona and 2 miles southeast of Cajalco Hill.

Ownership: 600-acre ranch held by Robert L. Moore estate, Riverside, California in 1945. Present (1962) owner and extent of holdings not determined.

History: Said to have been discovered in 1891 and some development work done during 1927-29. Idle since the early 1930's.

Geology: Series of parallel quartz-tourmaline veins in quartz monzonite. The veins strike northeast, are reported to contain copper oxides, and chalcopyrite is disseminated in the wall rock (Tucker and Sampson, 1945, p. 152).

Development: Several shallow shafts 20 to 40 feet deep on different veins.

Production: Undetermined, apparently none.

References: Tucker and Sampson, 1929, p. 496; Sampson, 1935, p. 516-517; Tucker and Sampson, 1945, p. 152; Bedford and Johnson, 1946, p. 10.
C.H.G. 8/10/62.

Prospect* (Name undetermined)

Location: SW $\frac{1}{4}$ sec. 4, T. 6 S., R. 4 W., S.B.M.,
Elsinore quadrangle 7 $\frac{1}{2}$ ', 1953; southern base of low
hills about one mile east of Elsinore, about $\frac{1}{4}$ of a
mile west of city dump.

Ownership: Undetermined.

History: Area prospected for tin in the mid-1930's;
idle many years.

Geology: Deeply weathered diorite and gabbro (San
Marcos gabbro) cut by sheared aplitic dike 5 ft. wide,
traceable more than 100 yards trending N. 65° E.

Development: Tin minerals reported sought in several
shallow pits along the southeast edge of the dike, and a
30-foot shaft, caved at the bottom and inaccessible at the
westernmost exposure of the dike.

Production: Little or no production.

References: Larsen, 1948, p. 133; Larsen, 1951, p. 49;
Engel et al., 1959, p. 77, 127.
C.H.G. 8/7/62.

*Adapted from Engel et al., 1959, p. 77, 127.

Prospect* (Name undetermined)

Location: S $\frac{1}{2}$ sec. 22, N $\frac{1}{2}$ sec. 27, T. 5 S., R. 4 W.,
S.B.M., Elsinore quadrangle, 7 $\frac{1}{2}$ ', 1953; about 3/4 of a
mile southeast of Highway 74, about 3 $\frac{1}{2}$ airline miles
northeast of Elsinore.

Ownership: Undetermined.

History: Area prospected for tin in the mid-1930's;
idle many years.

Geology: Pegmatite dike trends northeasterly through
quartz diorite (Bonsall tonalite) near contact with
Triassic(?) slates (Bedford Canyon Formation). Traces of
topaz and tourmaline were exposed in a shallow cut, but
tin-bearing minerals were not observed in 1954.

Development: Shallow open cut.

Production: No production.

References: Larsen, 1948, p. 133; Larsen, 1951, p. 49;
Engel et al., 1959, p. 77, 127.

C.H.G. 8/7/62

* Adapted from Engel et al., 1959, p. 77, 127.

South Black Rock Deposit

Location: NW $\frac{1}{4}$ sec. 19, T. 4 S., R. 5 W., S.B.M., Lake Mathews quadrangle, 7 $\frac{1}{2}$ ', 1953; about 7 miles south-east of Corona and 1 $\frac{1}{2}$ miles south of Lake Mathews.

Ownership: 80-acre tract owned by Hewitt S. West in 1945. Ownership and extent of holdings not determined (1962).

History: By 1929 the property had been explored by means of several shallow shafts and was under option to the American Tin Corporation but was idle (Tucker and Sampson, 1929, p. 497). The area was examined during the 1940's by the U.S. Geological Survey (Page and Thayer, 1945, 24 p., 13 figs.) and has since remained idle.

Geology: Tourmaline-quartz veins in quartz monzonite. According to Page and Thayer (1945, p. 24) the veins strike N. 30°-60° E. and, for the most part, dip 65°-80° SE. In places they are as much as 30 feet wide and are continuously exposed for as much as 800 feet. More than 150 assays of samples taken by the Black Rocks Tin Syndicate (about 1927-29) indicate that the average grade of these veins is probably between 0.03 and 0.05 percent of tin. The upper 30 feet of shaft No. 2 averages about 0.10 percent of tin over an average width of 56 inches.

Development: Two shallow inclined shafts sunk on the veins, and several shallow pits and trenches.

Production: Undetermined, apparently none.

References: Tucker and Sampson, 1929, p. 497; Sampson, 1935, p. 517; Tucker and Sampson, 1945, p. 152; Page and Thayer, 1945, 24 p. 13 figs.; Bedford and Johnson, 1946, p. 10; Gray, 1957, p. 643.

C.H.G. 8/10/62.

South Block Tin Group

Listed by Sampson (1935, p. 517). Apparently the same
as South Black Rock Deposit, which see herein.

Temescal (Cajalco) Mine

Location: Secs. 2, 3, 10, 11, T. 4 S., R. 6 W., S.B.M., Lake Mathews quadrangle, 7 $\frac{1}{2}$ ', 1953; 5 miles southeast of Corona and 1 $\frac{1}{4}$ miles west of Lake Mathews. The principal workings (Williams or No. 1 shaft and Robinson shaft) are in the SW $\frac{1}{4}$ sec. 2, just northeast of Cajalco Hill.

Ownership: In 1945 the holdings comprised 870 acres owned by Tinco Corporation, Richmond, Virginia. Amartin Incorporated, 1 North 6th Street, Richmond 19, Virginia was the owner of record in 1957. In the early 1960's the mine area and a large tract of adjacent land were acquired by the Lake Mathews Farming Company, Route 2, Box 98, Corona, California.

History: Tin was discovered in the Temescal district prior to the Civil War, probably in 1853. A vertical shaft had been sunk 95 feet when the outbreak of the Civil War stopped the work. Exploration was resumed in 1868, and in 1869 a 15.34 ton shipment of ore to San Francisco was said to have yielded 6,895 pounds of tin (Page and Thayer, 1945, p. 1). However, the first production of record was in 1891. Ore was mined during 1891 and 1892 and later in 1928-29. In 1942 a modern 100-ton mill was erected and 1,400 tons of surface vein material was put through with a recovery of less than a pound of tin oxide per ton (Tucker and Sampson, 1945, p. 154). During the period 1940-45 the U. S. Geological Survey mapped and sampled the area in considerable detail; the Cajalco mine was partly unwatered and the upper part of the old stope was examined. This investigation resulted in an open file report (Page and Thayer, 1945). Since 1945 the owners have attempted to reactivate the mine, but the property has remained idle. By 1963 a considerable acreage of citrus orchards had been planted in the area immediately north and west of the mine.

Geology: Tin, in the mineral cassiterite, is associated with veins and pipe-like masses of tourmaline-quartz rock in coarse-grained quartz monzonite (mapped as a phase of the Woodson Mountain granodiorite by Larsen, 1948, p. 132-133, plate 1). According to Page and Thayer (1945, p. 7,8) the average width of the veins, including spotted tourmaline rock and silicified rock, probably is 1 to 2 feet, although some of the veins are 6 feet wide, and in places a few are 15 to 20 feet wide. Most of the veins are less than 1,000 feet long and are discontinuous, although one vein system is about 4,800 feet long. The downward extent of the veins is not known but the Cajalco vein was followed to a depth of 690 feet and was not bottomed. Most of the veins, including the Cajalco vein, are in coarse-grained quartz monzonite, strike from about N. 20° E. to N. 50° E., and dip from 50° to 85° NW.

The Cajalco vein is exposed on the surface discontinuously over a length of 550 feet and has been explored continuously over a length of 1,000 feet. It strikes about N. 55° E. and dips from 55° to 80° NW. On the surface the vein is as much as 5 feet thick and, as exposed in the mine workings, ranges from 1 inch to 5 feet 10 inches. Maps of the mine indicate that two ore shoots were developed. One was about 70 feet and the other 160 feet in strike length, and the larger one had a dip length of about 240 feet. The Cajalco vein averages about 0.15 percent of tin. The cassiterite occurs as disseminations and as bunches and stringers in the tourmaline-quartz rocks. The ore that was milled is reported to have averaged in the range of 2 to 5 percent SnO₂ (Page and Thayer^s, 1945, 24 pp., 13 figs.).

Development: The principal workings at the Temescal mine explored the Cajalco or No. 1 vein and consist of an adit, a vertical shaft (the Robinson) now caved, an inclined shaft (the Williams or No. 1) that extends to a vertical depth of 540 feet, a raise to the surface from stope No. 1, and more than 5,800 feet of drifts and crosscuts on seven levels (Page and Thayer, 1945, p. 15). Other veins in the area have been explored by numerous shafts and adits with drifts and crosscuts. Considerable stripping and trenching also have been done on the veins. Most of the underground workings, including the stopes by means of which the two ore shoots were mined, are now inaccessible.

Production: The entire production apparently came from two connected cassiterite-bearing ore shoots in the Cajalco vein. According to Segerstrom (1941, p. 543) about 113 long tons of tin were produced from the district. Page and Thayer (1945, p. 2) arrive at a figure of about 130.5 long tons, using data from Rolker (1895, p. 537) and Segerstrom (1941, p. 543).

References: Hanks, 1884, p. 120-122; Goodyear, 1888, p. 506; Crossman, 1890; Benedict, 1890, p. 450-453; Fairbanks, 1893, p. 111-113; Rolker, 1895, p. 537; Fairbanks, 1897, p. 39-42; Merrill, 1917 [1919], p. 547-550; Tucker, 1924, p. 46; West, 1928, p. 131-132; Tucker and Sampson, 1929, p. 497-499; Sampson, 1935, p. 517-518; Segerstrom, 1941, p. 533-34, 543, 550-551; Tucker and Sampson, 1945, p. 153-154; Page and Thayer, 1945, 24 p. 13 figs.; Bedford and Johnson, 1946, 14 p.; Larsen, 1948, p. 132-133, pl. 1; Larsen, 1951, p. 48, 49, pl. 1; Pampeyan, 1952; Gray, 1957, p. 641-644.
C.H.G. 8/9/62.

Sand and Gravel

Sand and Gravel

Since 1949 the annual value of sand and gravel produced in Riverside County has been measurable in terms of millions of dollars (table ___/). Prior to 1955 most of the reported production came from quarries within the county. However, the sand and gravel industry has become increasingly flexible and mobile and the compilation of statistics for any given area can be misleading. Since 1955 much of the aggregate used in the more urban areas of the west end of the county has been transported as "ready-mix" or bulk raw material from plants and quarries in adjacent San Bernardino County.

Because Riverside County is undergoing rapid economic growth and a population increase which, between 1950 and 1960, exceeded that of any one of 15 states in the nation (Jamison, 1960, p. 3), increasing numbers of producers of building materials are establishing plants within the county. Riverside is the chief center of urban growth in the county. Future suburban development in the Perris-Hemet-San Jacinto area is probable and the increasing popularity of the Coachella Valley resort areas should stimulate a growing demand for building materials.

Construction of concrete bridges, abutments, and highways and the mixing and application of black top entail the transport of a variety of materials from relatively fixed sources. County, state and federal authorities involved in road-building activity maintain some local sources of materials but frequently place contracts with private companies. Much road base material, fill and riprap are obtained from sites convenient to construction locations, usually as a one time operation.

When the state supplies plans and specifications for highway work to interests bidding for contracts, it will (upon request and for a small fee) supply test data on materials available or involved in the work areas. Data for Riverside County are at the State Division of Highways, District 8, Materials Department, 247 3rd Street, San Bernardino.

Most sand and gravel concerns have one, or possibly several, permanent quarries. Many have, in addition, portable equipment to handle on-site jobs such as highway work or to obtain a particular grade of material from a source richer in that grade than their permanent pit.

The sand and gravel deposits of Riverside County consist of stream channel gravel, terrace deposits, and alluvial fan deposits. Rarely, if ever, will a single site yield a balanced supply of all grades of sand and gravel. It is common practice to employ crushing equipment but in sandy deposits, such as those found in the Riverside, Hemet, and Indio areas, supplementary supplies of rock must sometimes be sought. For general soundness of material and abundance of supply the alluvial fans and stream channel deposits along the north side of San Geronio Pass have proven to be one of the best sources of gravel in the western half of Riverside County.

In the sparsely populated eastern half of Riverside County the principal markets for aggregate are the agricultural communities along the Colorado River; Blythe, Ripley, and Palo Verde.

Abundant sand and gravel is present in stream channel and alluvial fan deposits along the margins of the mountainous areas of the eastern half of the county. In much of the desert area, however, alluvial material which underlies and adjoins the present water courses appears to have remained unworked by water since the early Quaternary (pl. ___/) and perhaps longer. In such material a desert soil profile has become established, a result of which is the formation a dense layer of caliche or hard pan (fig. ___/). Indeed in some areas there appears to be a succession of such layers (see herein under Chuckwalla Spring placers). Thus, what once was loose gravel is now, in part, fanglomerate. A different problem exists in the area underlain by the Palo Verde Mesa overlooking the flood plain of the Colorado River. Here, the Colorado River appears to have reworked the valley fill during the Quaternary. Although the material contains less caliche there is a disproportionate amount of fine silt and sand. Reworked fragments of clay-rich sediment are common in this deposit. Local firms have found that these clay fragments hang up in washers, or, if allowed to remain in the aggregate, cause "pop-outs" in concrete.

Feldspar and Silica

Feldspar and Silica

In the September, 1899 issue of the Mining and Scientific Press (vol. 79, no. 11, p. 289) there appeared the following statement, reprinted from the Riverside Press.

"In Menifee Valley a paying industry has developed in the shipment of white quartz to Los Angeles, where it is ground and used in the manufacture of fire brick."

This "paying industry" was based upon the exploitation for silica and feldspar, of numerous, rather small pegmatite dikes contained in the rocks of the Southern California batholith. These deposits are exposed in an irregular area extending from Riverside, southeastward to the Lakeview Mountains, to Anza, and south to Elsinore.

The local market for feldspar dwindled in the mid-nineteen thirties when talc largely replaced its use in wall tile manufacture (Wright, 1957, p. 199). Silica is now more economically won from sand deposits such as that near Corona (see herein) and refractory manufacturers are resorting to more extensive and more easily mined bodies such as the exposures of the Eureka quartzite in Inyo County (Clark and Carlson, 1957, p. 464).

Brown Silica (Quartz) Deposit

Location: Sec. 35, T. 4 S., R. 11 E., S.B.M. (Proj.), U. S. Army Corps of Engineers Pinkham Well quadrangle, 15', 1943; Hexie Mountains, Joshua Tree National Monument, about 3.5 miles north of Cottonwood Spring, and 0.6 mile west of the Cottonwood Pass road.

Ownership: Undetermined.

History: The property was originally operated in 1935 and apparently has been idle since that time. In 1945 the deposit was owned by E. M. Brown, Los Angeles (Tucker and Sampson, 1945, p. 163).

Geology: A tabular body of milky quartz is well exposed along its dip slope on the south side of a northwest-trending hill carved in the White Tank quartz monzonite (fig. 1/). It is approximately 20 feet thick in the open cut area. The quartz is massive, but thoroughly fractured, and coated with red-brown secondary iron oxides along prominently broken planes. A cloudy deep shade of white is typical, but along the margins of the body the quartz is more transparent and smoky.

Development: A bench about 15 feet high and 130 feet long has been hacked in the milky quartz adjacent to its contact with the White Tank quartz monzonite (Fig. 1/).

Production: In 1935, 300 tons of quartz (98.6% - iron free) were shipped to Gladding McBean Company, Los Angeles (Tucker and Sampson, 1945, p. 163).

References: Tucker and Sampeon, 1945, p. 163.

J.R.E. 10/13/59.

Figure 1/. Sketch maps showing the location (A)
and geology (B) of the Brown Silica (quartz) deposit (topo-
graphy from U.S.A.C.E. 15' Pinkham Well quadrangle, 1943).

2
American Encaustic Tiling Co.

See: California Land and Mineral Co. Deposits.

Blom Mine

See Ferris Mining Co. deposit.

4175-

Bundy-Murrieta Deposit

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 17, T. 6 S., R. 3 W., S.E.M.,
Romoland quadrangle, 7 $\frac{1}{2}$ ', 1935; just northwest of the
junction of Bundy Canyon Road and Murrieta Road about
10 miles south of Perris.

Ownership: Undetermined.

History: Undetermined.

Geology: A poorly exposed pegmatite dike as much as
15 feet wide cuts deeply weathered diorite. It strikes
N. 25° E. and appears to be vertical. The outcrop is
traceable for about 230 feet. The dike is composed of
quartz and feldspar and minor proportions of biotite and
allanite. The quartz forms what appears to be a contin-
uous central zone in the dike surrounding irregular
masses of feldspar as much as 3 feet in thickness. Some
of the quartz and feldspar occur^S as graphic intergrowths
but much of the material is quite pure. The feldspar
appears to be microcline. The quartz is milky and massive.
A few fragments of allanite crystals, found on the dump,
are weakly radioactive.

Development: The dike was explored by a shaft about
30 feet deep which is partially caved.

Production: Undetermined.

References: None.

R.B.S. 9/21/59.

California Land and Mineral Co. (American
Encaustic Tiling Co.) Deposits

Location: Secs. 4 and 5 (proj.), T. 7 S., R. 3 W.,
S.B.M., Murrieta quadrangle, 7½', 1953; in the north-
west corner of the Temecula Land Grant, northwest of
Antelope Road, and about 3 miles northeast of Murrieta.

Ownership: Undetermined.

History: In 1929 American Encaustic Tiling Company,
2030 E. 52d St., Los Angeles, was working deposits of
feldspar and silica in an 800-acre tract, at the above
location, under lease from California Land and Mineral
Company (Tucker and Sampson, 1929, p. 502). Operations
continued as late as 1931 (Sampson and Tucker, 1931,
p. 421).

Geology: The area is underlain by plutonic rocks,
that range from gabbro to diorite, which are cut by an
undetermined number of roughly lenticular pegmatite
bodies as much as 80 feet thick and several hundred
in lateral extent.
feet ^{wide}. Four pegmatites were examined. One is in
a low knoll in the NE¼ sec. 5, two are exposed on the
north flank of a low ridge in the NW¼ sec. 4, and
the fourth and largest body is just north of Antelope
Road in the NE¼ ^{1/4} sec. 4. On the quadrangle map, the
first three deposits are shown as prospects and the last
as a mine.

In the above order: the first pegmatite body is an essentially flat-lying mass with an exposed lateral extent of about 60 feet and thickness ranging from 0-20 feet. It consists of an unzoned mixture of quartz and feldspar. The two minerals are present as pure masses as much as 2 feet on a side and in coarse, graphic intergrowth.

Of the two pegmatite bodies exposed on the ridge in sec. 4, the one highest on the slope appears to be the larger. It is about 30 feet in thickness and is exposed through a horizontal distance of about 100 feet. This dikelike mass strikes N. 55° W. and is vertical. It comprises well segregated masses of quartz and feldspar, the quartz appearing to be the more abundant. Quartz occupies the full width of the body in some exposures but is extensively fractured and iron stained. A mass of quartz-feldspar pegmatite is exposed in the walls of a trench, about 50 feet long and 10 feet deep, lower on the slope of the ridge but the ~~volume~~^{direction} and attitude of this mass were not determined.

The deposit near Antelope Road is exposed in the walls of a quarry, about 120 feet long and 60 feet wide which is flooded to within 8 feet of its rim (October, 1960). The feldspar and quartz lense was reported to be as much as 80 feet in thickness at one point in the quarry and as much as 250 feet in length. Quartz was said to be the principal constituent (Sampson and Tucker, 1931, p. 421). This lense strikes west and appears to be essentially vertical.

Development: The northwest deposit (in sec. 5) was developed through a 30-foot adit (now largely caved) driven west to the bottom of a glory hole about 40 feet long, 20 feet wide, and 15 feet deep. In the north wall of the glory hole shallow galleries were driven several tens of feet in the quartz-feldspar body.

The larger mass in the ridge in section 4 was explored through an 80-foot adit (now caved) driven south to the bottom of a glory hole 40 feet deep and 60 feet in diameter.

The main quarry near Antelope Road was reported to have been ramified by crosscuts driven 40 feet north at the 60-foot level, from which raises ran to the hanging wall where material was removed by top slicing, and by stopes extending 130 feet east from the quarry (Sampson and Tucker, 1931, p. 421).

Production: In 1929, feldspar was being shipped at the rate of 200 tons per month from this property and a cumulative total of about 30,000 tons was reported (Tucker and Sampson, 1929, p. 503). No figure was given for silica. In 1931, 250 tons per month of silica were being shipped but very little feldspar. The cumulative figure for feldspar at that date was 50,000 tons (Sampson and Tucker, 1931, p. 421).

References: Tucker and Sampson, 1929, p. 502-503; Sampson and Tucker, 1931, p. 421.

R.B.S. 10/21/60.

Coahuila Brave (Williamson) Mine

Location: NE $\frac{1}{4}$ sec. 17, T. 7 S., R. 2 E., S.B.M., Hemet quadrangle, 1957; on the south slope of Coahuila Mountain, 7 miles west of Anza.

Ownership: C. E. Williamson estate (1958).

History: The Coahuila Brave was located in 1925. It comprised 5 claims totaling approximately 100 acres. The mine was worked for feldspar during the late twenties (Tucker and Sampson, 1929, p. 503-504).

Because of reduced local demand for feldspar this mine has been idle for many years. The Williamson family is still known in the area and have been intermittent occupants of a dwelling in a canyon below the mine.

Geology: The mine area is underlain by gneissic rocks which are cut by a group of about 7 roughly parallel pegmatite dikes. The developed dike strikes N. 15° W. to N. 40° W. and dips from vertical to about 35° NE. It is unevenly exposed for half a mile up the southwest flank of a ridge which trends southeast from the main ridge of Coahuila Mountain. This dike is from

40 to 50 feet wide where exposed in the mine but appears to be narrower throughout most of its outcrop. It is composed of microcline, massive, gray- to rose quartz and prisms of black tourmaline as much as 4 inches in diameter. Graphic intergrowth of quartz and feldspar is common. The dike is roughly zoned. The footwall side is composed of an intergrowth of black tourmaline, microcline, and quartz. Toward the middle of the dike the black tourmaline becomes sparse and quartz becomes more abundant. Quartz predominates along the hanging wall. The intergrowth of the constituent minerals would require considerable sorting to furnish a commercial product.

Development: This deposit was explored by 2 open-cuts about a quarter of a mile apart. The lower cut is about 30 feet wide and as many feet long with a 12-foot face on the dike. Here the dike is about 40 feet wide, strikes N. 15° W., and is nearly vertical. The upper workings are cut northwest 100 feet into the side of the ridge along the strike of the dike. The dike is exposed along the southwest side of the cut and in the face, which is about 50 feet high. Here it is 40 to 50 feet thick, strikes N. 40° W., and dips 35° NE.

Production: According to information submitted by the owner in August of 1929, 28 railroad-car loads had been shipped as of that date. The mine was idle at the time. It was stated that some quartz had been sorted and shipped. ~~The owners report appears in part in the Twenty-fifth Report of the State Mineralogist~~ (Tucker and Sampson, 1929, p. 503-504).

References: Tucker and Sampson, 1929, p. 503-504.
R.B.S. 6/24/58.

Reprint

Hemet Silica Deposit

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 26, T. 5 S., R. 1 W., S.B.M., Hemet quadrangle, 7 $\frac{1}{2}$ ', 1953; on the west slope of Hemet Butte about 2 miles south of Hemet.

Ownership: James L. Pool, 1048 Norumbega Drive, Monrovia.

History: Waring (1919, p. 16) states that a quarry was active at Hemet Butte during 1914-15. Tucker and Sampson (1929, p. 504-505) list the Hemet Silica Company as the earliest reported operator, followed by San Jacinto Rock Products Company who held it in 1929. The property apparently has been idle for many years. The present owner purchased the land from James Schideler, 609 E. Central, Hemet.

SILICA-FELDSPAR

Tungsten

Tungsten

Riverside County tungsten production statistics start in 1942 and end in 1956 with some of the included years showing no recorded yield. As shown on plate __/, accurate figures from which to derive a year-by-year total were not found, however, at best tungsten has been a minor commodity in the county.

The largest single source of tungsten has been the Pawnee mine (see herein) in the Beauty Peak area the holdings of which lie largely in San Diego County. The other properties appear to have yielded only small quantities of concentrates.

Scheelite (CaWO_4) has been found in gold districts in association with quartz veins and igneous dikes. Indeed, in the Chuckwalla Mountains, it is possible that all the minerals of the scheelite group may yet be identified, for the auriferous veins of that range contain minor amounts of copper, lead and molybdenum minerals. Traces of scheelite have been found in contact zones in the igneous-metamorphic complex of the Big Maria Mountains at the eastern end of the county but the most promising prospects have been in tactite bodies in the metamorphosed rocks of the San Jacinto and Santa Rosa mountains and the Beauty Peak area.

There are no known high-grade tungsten deposits in Riverside County and activity in tungsten has been largely dependent upon the government stockpiling program.

"Stockpile purchase of tungsten concentrate was authorized under the Strategic and Critical Materials Stock Piling Act (Public Law 520, approved July 23, 1946) and the Defense Production Act of 1950 (Public Law 774), approved September 8, 1950). Purchase of concentrates from domestic producers was terminated in December 1956, and the last contract for the acquisition of foreign concentrate was fulfilled in 1959.

Under the Defense Minerals Exploration Administration, a program beginning in April 1951 provided exploration loans up to 75 percent of the cost. This program, for tungsten, ended on September 11, 1958." (Holliday, 1960, p. 915).

Tungsten

Aztec (Chuckwalla Tungsten Mine) Claim

Location: Sec. 22 (?), T. 6 S., R. 15 E., S.B.M.,
(proj.)
U. S. Army Corps of Engineers Chuckwalla Mountains
quadrangle, 15', 1945; 5½ miles south of Desert Center
and 2 miles west of Aztec Well.

Ownership: Last reported (1958) owner was Bonnie L.
Bowers, et al., 302 San Antonio Avenue, San Diego 6.

History: Tucker and Sampson, (1945, p. 154, pl. 35)
described a property under the name Chuckwalla Tungsten
Mine, which resembles the Aztec but the location given
is about five miles to the east near Corn Spring.
The Aztec once was called the Chuckwalla Tungsten
Mine but this may simply be a duplication of names.

According to papers found on the property,
in 1949 and 1950 the Aztec was held by Oscar F.
Neuerberg, 8094 El Capitan, La Mesa. (but) the earliest
date of the present owners claim was not determined.

Geology: The Aztec Claim is on a quartz vein ranging from 0 to 4 feet in thickness which strikes N. 40° - 70° W. across a low granite ridge through a distance of about 200 feet. The vein dips 35° - 40° SW. Scheelite is present as scattered crystals and as thin, lenticular bodies as much as 1½ inches wide. It is characterized by a straw-yellow to honey-brown color. In addition, the vein carries scattered, small bunches of pyrite, chalcopyrite and galena. Most of the pyrite has altered to iron oxides and secondary copper minerals. The galena is altered in part to cerussite and wulfenite. Gold probably is present.

Development: A crosscut adit has been driven into the west slope of the ridge (fig. ). The vein was reached about 10 feet from the portal and a drift was run 40 feet southeast. Two short raises extend 10 and 15 feet to the surface from the drift. An open-cut has been dug on the east slope of the ridge with the apparent purpose of starting a drift adit to join the working in the west slope. Some trenching has been done on the outcrop.

Production: Undetermined.

References: Tucker and Sampson, 1945, p. 154, pl. 35.

R.B.S. 2/24/60.

Carr Mine

See Pawnee Mine.

Chuckwalla Tungsten Mine

See Aztec Claim.

Crescent Deposit

Location: SE $\frac{1}{4}$ sec. 28, T. 4 S., R. 23 E., S.B.M. (proj.), Big Maria Mountains SE. quadrangle, 7 $\frac{1}{2}$ ', Calif.-Ariz., 1955; Big Maria Mountains, about 18 miles north of Blythe.

Ownership: Undetermined.

History: Clyde H. Reynolds located the Crescent in May 1954.

Geology: Much of the work is in a tactite zone, as much as 10 feet thick, between intrusive leucogranite and tan colored wollastonite-bearing carbonate rock. These rock units comprise a part of the McCoy formation (Miller, 1944, p. 32). The wollastonite-bearing rock trends northwest, dips 41° SW, and locally is veneered by a black ~~coat of~~ desert varnish. The tactite is composed largely of brown medium-grained limestone, ~~and~~ garnet, ~~green~~ diopside, ~~and~~ chlorite, and minor amounts of ~~epidote~~ prismatic epidote and clear to cloudy scheelite. ^{in a matrix of} The leucogranite is cut by veinlets of milky quartz and near the contact with the wollastonite-bearing rock is strongly foliated with sub-parallel bands of biotite altering to chlorite. Medium grained cubes of limonite pseudomorphic after pyrite occur ^{locally} ~~sporadically~~. One-tenth of a mile to the east in an adjacent south-trending canyon, ^{epidote with quartz} several ^{veins} ~~of~~ ^{epidote-} ~~bearing quartz~~ are exposed. They intrude a coarse-grained brown limestone which underlies the wollastonite bearing rock.

Development: Several pits and trenches, the largest about 15 feet in length, have been dug south into the tactite zone. In the adjacent gulch, numerous small pits, open cuts, and trails have been gouged out. All work here is in wollastonite-bearing rock, and no mineralization was observed. A good dirt road leads from the property, passing by several Giant Indian Intaglios, to a junction with U. S. Highway 95 about 17 miles north of Blythe. Elevation of the prospect is about 800 feet. It is idle.

Production: Undetermined.

References: Miller, 1944, p. 32.

J.R.E. 12/19/58.

Garnet Queen Mine

Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20, T. 7 S., R. 5 E., S.B.M., Toro Peak quadrangle, 1941; on the east slope of Santa Rosa Mountain at an elevation of 6,000 feet.

Ownership: Santa Rosa Tungsten Corporation holds the mineral rights to this property (1958).

History: ^{The Garnet Queen} This property was first worked in 1896, in search of gold. Subsequent activity has been devoted to the exploration of a scheelite-bearing deposit. In 1941 a small concentration plant was installed by Elliot and associates, Glendale, California (Tucker and Sampson, 1941, p. 582) but no record of activity in subsequent years was found.

Geology: The Garnet Queen Mine explores one of a number of scattered, scheelite-bearing tactite bodies in a belt of schists which strikes east to southeast across ~~the granitic terrain of~~ Santa Rosa Mountain (Wright, 1946, pl. 1). When visited in 1958, the ore body was not exposed. Tucker and Sampson (1941, p. 582) state that the width of the tactite ranges from 2 to 6 feet and its attitude is N. 8° E., 70° S. It is composed of quartz, garnet, epidote, diopside and 0.7 percent WO₃, contained in sparsely distributed scheelite.

Development: The workings consist of an open trench about 100 feet long and a 30-foot vertical shaft. The vertical shaft was sunk in 1896. It is reported to have followed gold-bearing quartz stringers (Tucker and Sampson, 1941, p. 582). ~~Idid.~~

Production: The plant built in 1941, had a capacity of 10 tons per day. The concentrate was reported to have contained 60 percent WO_3 (Tucker and Sampson, 1941, p. 582) but the amount shipped was not determined.

References: Tucker and Sampson, 1941, p. 582; 1945, p. 154; Wright, 1946, pl. 1).

R.B.S. 6/26/58.

Good Fairy Claim

Location: SW $\frac{1}{4}$ sec. 10 (proj.), NW $\frac{1}{4}$ sec. 15 (proj.), T. 8 S., R. 17 E., S.B.M., Chuckwalla Spring quadrangle, 1953; on the north slope of the Chuckwalla Mountains, about 1 mile north-northeast of Chuckwalla Spring.

Ownership: Undetermined.

History: Undetermined.

Geology: A shear zone as much as 12 feet wide is exposed on the northwest slope of a northeast-trending ridge of gneissic dioritic rocks. From the southwest end of the outcrop to the northeast end, a distance of about 500 feet, the strike changes from north to N. 15° E. The dip is about 65° E. to east-southeast. A quartz vein 3 to 8 feet wide lies along the footwall of the shear zone. The vein is fractured, and stained and pocketed with iron oxides which appear to have resulted from the weathering of pyrite. This material resembles gold ores of adjacent areas but according to Ben I. Brewer, who holds nearby placer claims, this is a tungsten prospect. The presence of tungsten minerals was not verified.

Development: The shear zone is explored by 4 shallow prospect pits.

Production: Undetermined. ~~Idle, 1959.~~

References: None.

R.B.S. 11/19/59.

Lucky Strike Mine

Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 33, T. 8 S., R. 3 E., S.B.M., Warner Springs quadrangle, 1939; about one mile north of Chihuahua Creek and just east of the road connecting Duranso and Chihuahua valleys.

Ownership: Undetermined (1958).

History: Undetermined.

Geology: The Lucky Strike mine is in an area of gneissic metamorphic rocks cut by thin pegmatite dikes. A tactite zone is exposed in an area about 200 feet square on a low ridge, on the north side of a canyon. The tactite consists of garnet, quartz, epidote, calcite and presumably, some scheelite, though none was found in samples taken.

Development: The tactite body was explored by an adit of undetermined but probably short length, driven eastward into the side of the ridge. The portal is badly caved. In addition, several shallow pits and trenches indent the crest and sides of the ridge.

Production: Undetermined. Idle.

References: None.

R.B.S. 7/21/58.

1000
Oak Grove Mine

See Pawnee Mine.

Pawnee (Carr, Oak Grove) Mine

The following information is taken in part from a report by F. H. Weber, Jr., done in the course of his work in San Diego County.

Location: NE ³¹/₄ sec. ^{8 1/2} T. 8 S., R. 3 E., (San Diego County), and SE ³¹/₄ sec. 31, T. 8 S., R. 3 E., (Riverside County), S.B.M., Warner Springs ^{NW 1/4} quadrangle, ^{7 1/2'} 1939; about 6 miles northeast of Oak Grove, along the boundary between San Diego and Riverside Counties.

Ownership: Verdi Development Company, 2623 Hyperion Ave., Los Angeles 23, holds 5 unpatented claims (1957).

History: The tungsten-bearing deposits on the lower southeast slopes of Beauty Mountain were first prospected in 1917 by Bert Simmons and John Wentworth of Aguanga who located 18 claims in the area, and perhaps produced a small quantity of tungsten-bearing concentrates. The deposits were then idle until the Pawnee deposit was developed and worked on a small scale in the late 1930's by Frank Carr of Aguanga. In the 1940's it was worked by E. L. and William Carr. The Pawnee Mine Incorporated, of Beverly Hills acquired the Pawnee property in 1951 and sold it to the Verdi Development Company in late 1955 or early 1956. It has been idle since 1956.

Geology: The tungsten-bearing deposits in the Beauty Mountain area consist of bodies of tactite enclosed concordantly in metamorphic rocks composed chiefly of schist and gneiss. Small irregular intrusive bodies of granitic rocks cut the metamorphic rocks. Of chief interest on the Pawnee property are two bodies of tactite about 1500 feet apart, on a narrow north-trending interfluvium that abuts Chihuahua Creek on the south. The more productive of the two lies in San Diego County, about 400 feet north of Chihuahua Creek and 150 feet north of the mill (see figure). This body strikes N. 20°-25° E. and dips about 85° southeast. It ranges in length from 55 to 70 feet, and in width averages about 8 feet. The body has been worked vertically to a depth of about 140 feet. It is composed of a medium- to coarse-grained aggregate of quartz, brown garnet, epidote, calcite, diopside (?), and scheelite. The ore probably averaged about one percent tungsten trioxide.

The second body of tactite lies about 1,500 feet to the north of the more productive body, on the west side of the ridge, and in Riverside County. It has yielded only a small amount of tungsten ore. The body strikes north-northwestward and dips steeply southeast. Its dimensions were estimated by L. C. Penhoel (unpublished consulting report, 1953) as follows: length, 75 feet or more; width, 45 to 55 feet. It probably averages about $\frac{1}{2}$ percent tungsten trioxide.

Development: The more productive body is developed by a 180-foot shaft from which drifts trend north-north-eastward and south-southwestward on the 90- and 140-foot levels. The two drifts range in length from 70 to 90 feet and are appended to stopes. From a point 50 feet south of, and 35 feet lower than the collar of the shaft, a drift adit trends N. 10° E. From this drift the orebody was stoped to the surface, to leave a trench-like glory hole which ranges in depth from 10 to 40 feet, and in width from 10 to 15 feet.

The less productive body lies on the west side of the ridge, in Riverside County. It has yielded only a small amount of tungsten ore. The body strikes north-northeastward and dips steeply southeast. Its dimensions were estimated by L. C. Penhoel (unpublished report, 1953) as follows: length, 75 feet or more; and width, 45 to 55 feet. It probably averages about 2 percent tungsten trioxide.

Production: Total production from the deposits in the area is probably slightly more than 3,000 units of tungsten trioxide (WO_3).

Ore was milled on the property. The mill is still mainly intact and contains a jaw crusher, rolls, ball mill, and 2 concentrating tables. It has a capacity of about 1 to 2 tons per hour.

References: Hess and Larsen, 1921, p. 260-261; Tucker,
1925, p. 353; Tucker and Sampson, 1940, p. 48; 1941 p.
583-584; 1945, p. 156; Partridge, 1941, p. 318; Jenkins,
1942, p. 344, 353; Kerr, 1946, p. 161; Eng. and Min.
Jour., Mar. 1956, p. 132.
F.H.W. 6/58.

Red Ocher Deposit

Location: At the south edge of Sec. 26 (proj.), T. 3 S., R. 20 E., S.B.M., Midland quadrangle, 1952; on the north slope of the Little Maria Mountains about 3 miles northwest of Midland.

Ownership: Emmett Ball, Jr., 15498 Vallejo, Victorville, and Charles Reno, Eagle Mountain own 3 unpatented claims (Red Ocher, Red Ocher No. 1, Red Ocher No. 2).

History: This property was located in 1953 and worked briefly for tungsten in 1954. Only assessment work has been done on the iron deposit.

Geology: A zone of alteration comprising silicified limestone and oxides of iron strikes northwest and dips steeply northeast. The footwall is monzonite and the hanging wall is silicified limestone.

Iron oxide is contained mainly in two en echelon bodies connected by thin stringers. The larger and upper body is as much as 60 feet wide. The deposit contains an estimated 30,000+ tons of hematite as pure as 85% Fe_2O_3 (Personal Communication, Emmett Ball, Jr., 1961).

Tungsten, probably in the mineral scheelite, was mined from thin quartz veins as much as one foot wide in monzonite.

Development: The deposit is explored by a 10-foot shaft, a 20-foot shaft, and several open cuts.

Production: One ton of selected tungsten ore was shipped in 1954 and yielded 78 pounds of concentrates.

References: None.

R.B.S. 9/20/61.

Tubbs Claims

Location: Sec. 5 (?), T. 7 S., R. 15 E., S.B.M.,
U.S. Army Corps of Engineers, Chuckwalla Mountains
quadrangle, 15', 1945; on the southwest side of a north-
west-trending canyon 9 miles by dirt road southeast from
U. S. Highways 60 and 70, and 8 miles south-southwest
of Desert Center. These claims are just southwest of
the Red Cloud Group (fig. ___).

Ownership: Elmer E. Tubbs, 516 Eye Street, Bakers-
field, holds five unpatented claims. (1955)

History: This ground once was worked for gold in
the late 1800's and may be the site of the long abandoned
Keystone, Blackbird, and Monarch Mines (Orcutt, 1890, p. 901)
and/or the Liberty Group (Tucker and Sampson, 1929, p. 483).

Geology: This deposit lies in the plane of a fault
which strikes N. 10° W. and has a vertical- to steeply-
northeasterly dip. The fault zone is as much as 20 feet
wide and well exposed for several thousand feet. The
deposit comprises a quartz vein containing pyrite and
secondary oxides of iron, a basic dike, and a silicified
zone ranging from 7 to 10 feet wide. The tungsten-bearing
quartz appears to have filled and altered fractured portions
of the basic dike. The resulting silicified material con-
tains minor proportions of iron oxides, lavender fluorite,
and scheelite. According to the owner, a significant

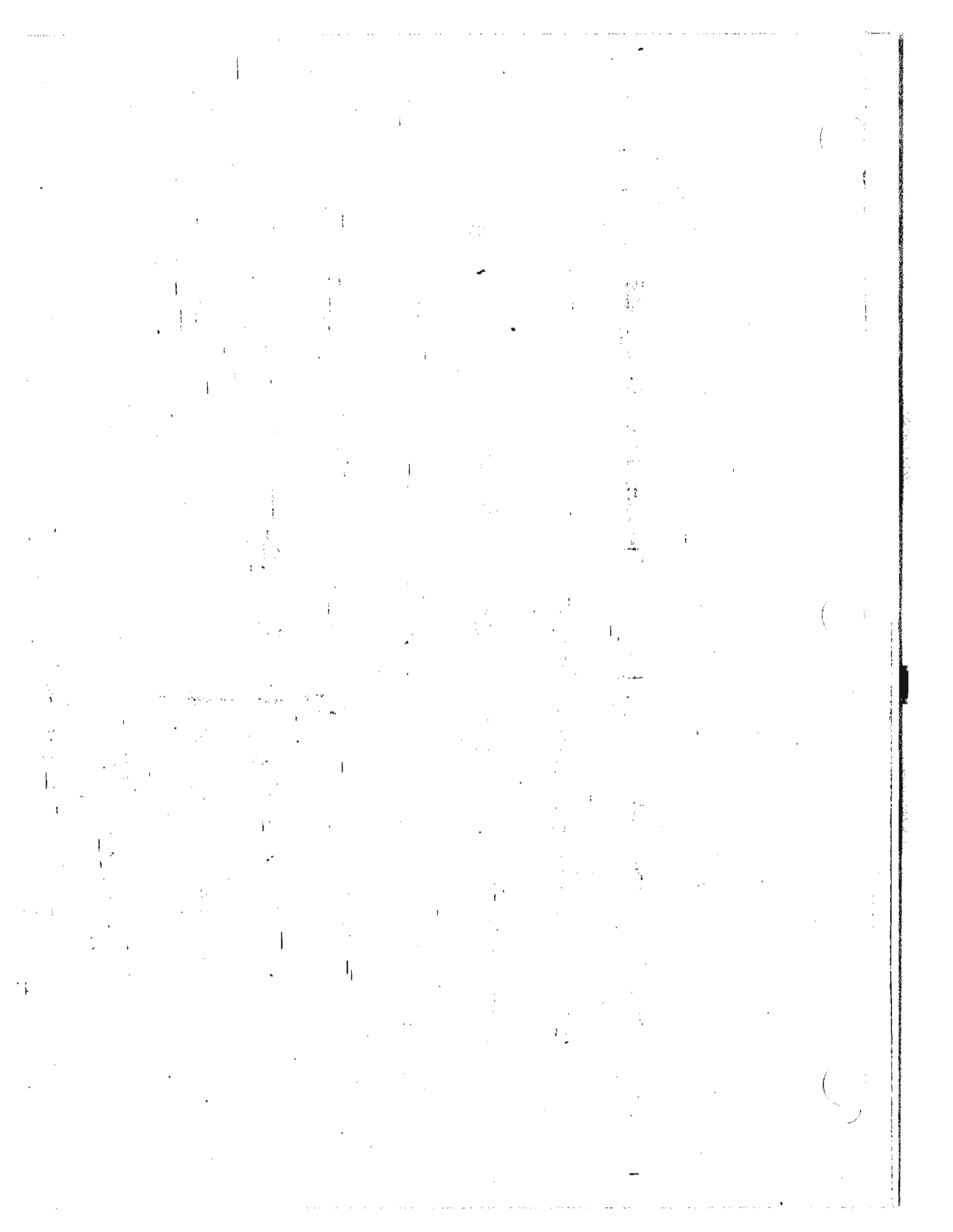
proportion of the tungsten-bearing quartz contains about 1 percent scheelite. Pyromorphite and chrysocolla are present as thin crusts on cavernous quartz exposed in a prospect about one-quarter of a mile south of the mine shaft. One sample, from the same prospect, contained a small, well-formed crystal of wulfenite.

Development: Although no systematic mining has been done for scheelite the deposit has been well prospected by means of a 50-foot shaft, a 50-foot adit, two 30-foot adits, and numerous open cuts and trenches some of which probably represent the search for gold by previous owners.

Production: Undetermined.

References: Orcutt, 1890, p. 901; Tucker and Sampson, 1929, p. 483.

R.B.S. 1/21/60.



Uranium

Uranium

The uranium boom of the late 1940's and early 1950's encouraged many people to stake claims in Riverside County ^{to about 1950.} but none of these holdings had yielded saleable ore in profitable quantities, (through 1962.)

Secondary uranium minerals are present as thin fissure fillings and crusts in fractured metamorphic rocks in scattered localities and several gold mines and prospects have been found to contain mildly radioactive, unidentified material (see also tabulated list under Radioactive Deposits).

Ironwood #1 Prospect

Location: NW $\frac{1}{4}$ sec. 20 (proj), T. 3 S., R. 23 E., S.B.M., Big Maria Mountains NE. quadrangle, 1954; Big Maria Mountains, about 20 miles north of Blythe and 3 miles west of Quien Sabe Point.

Ownership: Undetermined.

History: Guy Waite and Cyrus H. Ferguson, Box 29, Parker Star Rt., Blythe, located the Ironwood #1 in March 1956.

Geology: The prospect is in fine to medium-grained hornblende granite. Thin pegmatite dikes occur locally and may contain radioactive minerals. No mineralization was observed and no radioactive anomaly was recorded.

Development: A 9-foot burrow has been dug into the east side of a stream bank at about a 1,000 foot elevation. The winding dirt road that leads from the property to a junction with U. S. Highway 95 about 2 $\frac{1}{2}$ miles north of River Bend Lodge is in fair condition. The prospect is idle.

Production: Undetermined.

References: None.

J.R.E. 12/16/58.

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Ram Uranium Deposit

Location: SE $\frac{1}{4}$ sec. 4, T. 2 S., R. 11 E., S.B.M. (proj.), Valley Mountain quadrangle, 1956; Pinto Mountains, 7.2 miles S. 16° W. of Old Dale (junction of the Twentynine Palms Highway and the Gold Crown Road).

Ownership: R. H. Morath, E. Adamson, and B. Raush, 11060 Brink, Norwalk, own at least 13 unpatented claims (October 1959). *R. H. Morath*
Box 444, Bell Calif.

April 1964 holds lease on entire property from the other named owners, etc.

History: Undetermined.

Geology: The Ram deposit is in a much faulted area typified by blue-gray and buff quartzite and coarse-grained tan to white limestone beds (fig. 1/). Lenses of uraninite (UO_2) no more than 1 inch thick are almost entirely altered to the secondary uranium minerals carnotite- $\text{K}_2 (\text{UO}_2) (\text{VO}_4)_2 \cdot n\text{H}_2\text{O}$, uranophane - $\text{Ca} (\text{UO}_2)_2 (\text{SiO}_3)_2 (\text{OH})_2 \cdot 5\text{H}_2\text{O}$, and cuprosklowskite - $\text{Cu} (\text{UO}_2)_2 (\text{SiO}_3)_2 \cdot 6\text{H}_2\text{O}$. The lenses occur in fractures, joint planes, and along minor faults in blue-gray quartzite. Locally surfaces of the quartzite are coated with a thin veneer of the yellow and yellow-green secondary uranium minerals.

Development: Three prospect pits, a 15-foot rectangular open cut, and a 30-foot adit are cut in the west slope of a north-trending ridge (fig. 1/). Several other prospect pits are across the canyon to the west, and also adjacent to the road leading north toward the Groover mine. A jeep road, washed out near the Groover mine road intersection leads north and west to a junction with the Twentynine Palms Highway. The mine is idle.

Production: Undetermined.

References: None.

J.R.E. 10/12/59.



Figure 1/. Geologic sketch maps (A and B),
showing the location, geology (A), and principal workings
(B) of the Ram deposit (topography from U.S.G.S. 15'
Valley Mountain quadrangle, 1956).

Water Resources

Water Resources

Riverside County water resources have been studied in a series of separate investigations each of which has been confined to a specific basin or desert region. Much of the material in this section is based upon reports (listed in the bibliography) by the following authors:

Walter C. Hendenhall, 1909, Coachella Valley)

Gerald A. Waring, 1919, (San Jacinto and
Temecula basins)

Eckis, Rollin F., 1934, (Riverside, Arlington
and Temescal basins)

Wayne MacRostie, 1953, (Elsinore Basin)

David B. Willets and others, 1954,
(Colorado River Basin)

Robert T. Bean, 1955, (San Jacinto and
Elsinore Basins)

L. R. Illingworth, 1956 (Santa Margarita
{River Investigations})

Wayne MacRostie and A. J. Dolcini, 1959
(Santa Ana River investigation)

Fred Munkel, 1963, (Pinto Basin)

Surface water

The accompanying map shows the principal watersheds, basins, water bodies and aqueducts in Riverside County.

The principal sources of surface water in the western half of the county are the San Bernardino and San Jacinto mountain ranges, and Agua Tibia and Palomar mountains. Except for the San Jacinto Mountains, these catchment areas lie outside the county boundaries. The sparse (~~surface flow~~^{runoff}) in the desert east of the Coachella Valley (~~is in dry~~^{enters}) washes in which water flows^{only} during storms or unusually wet seasons. The Colorado River adjoins the eastern edge of the County.

The Santa Ana River gains a fairly sustained flow of good water from the San Bernardino Mountains, although the surface flow is only intermittent. The high quality of this water is attributed to storage of rain and melted snow in granitic and metamorphic rocks from which a minimum of dissolved matter is derived. Downstream tributaries drain areas underlain in part by sedimentary rocks containing more readily soluble minerals and connate brines.

The Whitewater River extends from headwaters on the southeast slope of the San Bernardino Mountains to the Salton Sea. It flows through its entire length only under flood conditions. In its headwater region the Whitewater River has a sustained flow of good water but this seldom extends beyond the canyon mouth at Whitewater, at or near which point it percolates into the alluvium and into the groundwater basin of Coachella Valley. In its lower reaches the channel of the Whitewater River has been deepened to

ford drainage for irrigated lands. Here water entering the Salton Sea contains nearly 5,000 parts per million total dissolved solids.

The San Jacinto River flows from headwaters on the southwest slope of the San Jacinto Mountains to a terminus in the Elsinore Basin. Storage and diversion have dried most of the stream bed during much of the year. Little surface flow reaches the Elsinore Basin except in times of flood because of Railroad Canyon Dam. The San Jacinto River is one of the important sources of groundwater recharge in the San Jacinto and Ferris valleys. Water discharged from the Railroad Canyon Reservoir recharges the groundwater supply in the Sedco area southeast of Elsinore.

The upper 5 miles of the Santa Margarita River and most of its headwater tributaries lie within Riverside County. This river flows southwest from Temecula to the Pacific Ocean. The headwater area includes the watershed of Murrieta Creek and most of the watershed of Temecula Creek. Murrieta Creek drains the Elsinore Fault basin as far northwest as Wildomar and is joined by smaller creeks which drain areas as far northeast as Domenigoni, Diamond, and Weber valleys. Temecula Creek and its tributaries drain the north slopes of Agua Tibia and Palomar mountains and Oakgrove Valley to the southeast in adjoining parts of San Diego County; areas as far east as Coachella and Burnt Valleys and northeast as far as Reed Valley below the southwest slopes of Red and Little Coachella mountains.

Most of the stream beds in the Santa Margarita River watershed are dry during much of the year. Surface water quality varies both areally and with rate of flow but in general it is suitable for irrigation and domestic use.

Ground water

Ground water is that water in the zone of saturation lying below the water table. The quality, quantity, and distribution of ground water is governed by geologic and climatic history and the modifications of human use and development.

Riverside County comprises a part of the earth's crust which is cut by at least two major fault systems and many local fault and fracture systems. Groundwater storage tends to be compartmented in discreet basins, especially in the fault-bounded valleys of the eastern desert area. Annual recharge from rainfall is small and in most basins water encountered in wells represents accumulated storage. Water quality generally is better in basins from which there is a regular subsurface discharge. In the western half of the county water commonly is sought in buried stream courses. One such source is a north-trending, bedrock canyon underlying the alluvium in the Arlington and Riverside areas. Another canyon, cut in bed rock, appears to control subsurface drainage in the Moreno, Morris, San Jacinto and Menifee valleys. Some wells in the Menifee Valley have yielded over 1,000 gallons per minute when pumped, but

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no trouble has been encountered with water mineralized by buried organic materials. In parts of the above named valleys both pumping and recharge are hindered by the low permeability of the sediments. As the basins filled the gradients of the influent streams decreased and the basin fill was capped mainly by fine deeply weathered material. Rain water commonly ponds and evaporates without penetrating the valley floor. Some permeable sands comprise narrow, irregular channel filling which wells encounter only by luck. Some wells must penetrate numerous permeable sand layers to support pumping. As a general rule sediments become more coarse and permeable with depth but in many

Wells near basin margins bed rock is reached before adequate yield is assured.

The area surrounding Corona is called the Temescal Basin. This basin occupies the Elsinore Fault Zone from Elsinore northwest to the Santa Ana River. It is drained through Temescal Wash. Groundwater in Temescal Basin is derived mainly through percolation from Temescal Wash and numerous small water courses draining the northeast slope of the Santa Ana Mountains. Some additional water is gained from irrigation return and possibly from underflow from Arlington basin, to the northeast, through Arlington Gap. On rare occasions Temescal Wash receives overflow from Lake Elsinore, the last outflow having occurred in 1917. As a result the water of Lake Elsinore usually contains substantial concentrations of salt.

Because of poorer lower tributary water and effluent seepage from ground water or sewage, the quality of water in subsurface flow tends to be markedly poorer in the Santa Ana River during the summer months, especially below Prado Dam at the western tip of the county.

The northwest end of the Coachella Valley is the only desert area which receives runoff from timbered highlands in or adjacent to the county. In the Whitewater area the well depths are about 500 feet. At Palm Springs wells range from 100 to 200 feet in depth. Southeast of Indio ground water is encountered within 50 feet of the surface. Early wells in the Coachella area yielded surface artesian flow from ground water confined beneath impermeable surface material. Artesian effects still exist in wells of that area but do not reach the surface. Ground water quality shows an irregular, progressive decrease from Whitewater to the Salton Sea. One change is a decrease in calcium as and an increase in sodium ions. The total amounts of dissolved mineral matter are small, however, and in the irrigated areas of the southeast end of the Coachella Valley many farmers use well water to supplement imported Colorado River water and a few prefer its exclusive use. Natural mixing of imported water with ground water is inhibited by fine-grained sediments which underlie most of the irrigated areas.

In the desert area lying between Indio and Blythe the principal proven groundwater storage areas are Pinto Basin and the basin underlying Chuckwalla Valley.

In Pinto Basin, ground water is deeper than 95 feet below the surface. In 1933, Kunkel estimated the storage capacity of the upper 100 feet of saturated alluvium in the central part of the basin to be about 230,000 acre-feet. The water in Pinto Basin is the sodium sulfate type containing less than 1,000 ppm (parts per million) dissolved solids. It would be considered of good general quality save for a fluoride content from 2.0 ppm to as high as 2.7 ppm. The U.S. Public Health Service (1946) set a mandatory upper limit of 1.5 ppm of fluoride for drinking and culinary water supplied by interstate carriers and others subject to federal quarantine regulations. Sodium ion concentrations in water from several wells in the basin are between 200 and 300 ppm which is high enough to make the water of doubtful quality for irrigation.

The water in Pinto Basin is the result of long accumulation. Subsurface flow is eastward toward a narrow channel between the east end of the Eagle Mountains and the Coccomb Mountains. Here, groundwater is reported to discharge across a subsurface barrier into the lower, adjacent basin underlying the Chuckwalla Valley.

Until recent years, wells in the Chuckwalla Valley have yielded water of poor quality. Total dissolved solids are reported to range from 420 ppm to as high as 4,372 ppm with fluoride concentrations that range from 1.7 ppm to 35.0 ppm. This water is from wells ranging in depth from 15 feet to 400 feet. Depth to water is reported to range from 11 feet to 70 feet. In the early 1960's several wells were drilled to depths ranging from 700 feet to 900 feet. Water of improved quality is reported from these deep wells but no chemical data were obtained. No data on reserves or groundwater movement were obtained for the Chuckwalla Valley. Palen and Ford dry lakes are base levels for surface drainage. Judging from surface drainage the Wiley Well area, east of the Little Chuckwalla Mountains, appears to be the most likely site for subsurface discharge from the Chuckwalla Valley if such drainage exists.

Groundwater recharge in the Palo Verde Valley is by percolation from the Colorado River and sporadic discharge from desert washes primarily McCoy Wash. The City of Blythe draws water from wells for domestic use. The well water has a higher total-dissolved-solids analysis than the river water. Like the river water, available analyses show no fluoride.

Early efforts to develop water supplies in Riverside county consisted mainly in the use of natural springs, streams, and sinking shallow wells. In the desert, miners usually had to transport water. Six wells were dug in Pinto Basin during the various periods of mining activity. By the later 1950's two of these had been destroyed and two had fallen into disuse. In the early 30's the Metropolitan Water District dug Pinto Well at the outlet of Pinto Basin. Kaiser Steel Corporation has used Pinto well since 1949, and in 1957 completed a nearby well. The water from these wells is used at the Eagle Mountain mine and beneficiation plant. By 1959 Kaiser's annual consumption from the wells was 1,700 acre feet. From 1953 through February 1956 the water level in Pinto Well had lowered about 2.5 feet. From February 1956 through October 1960 water levels in both wells was down 14 feet. The old well and new well are 432 feet and 675 feet in depth respectively; in 1960 water levels were 102.62 feet and 114.22 feet below the surface.

Conservation and supplement

Using local sources of water as a basis of judgment, much of Riverside County is water deficient. The Palo Verde Valley, Pinto Basin (and possibly the Chuckwalla Valley), the southeast half of the Coachella Valley (southeast of Indio) and the watershed of the Santa Margarita River are areas in which natural reserves meet or exceed the demands of development.

Various systems of water conservation, flood control and impoundment are in use to supply the demands of the populous western half of the county. The south fork of the San Jacinto River was dammed in 1895 by the Lake Hemet Water Company. The reservoir (Lake Hemet) has a capacity of 14,000 acre-feet. In 1923 the Tenoscal Water Company dammed the main channel of the San Jacinto River to form Railroad Canyon Reservoir with a capacity of 12,000 acre-feet. The Gage Canal Company constructed the 1,000 acre-foot Hockingbird Canyon Reservoir in 1914. In 1949 the Vail Company completed Vail Dam and reservoir on Tenecula Creek the maximum reservoir capacity of which is about 49,500 acre-feet.

The U. S. Army Corps of Engineers has engaged in flood-control work; Prado Dam is the most extensive of their projects in Riverside Co. This earth-fill dam blocks the head of Santa Ana Canyon at the east end of Chino Hills. It is 2,280 feet long and 106 feet high. The project was started in 1938 and completed in 1941. Flood waters are controlled by other smaller structures such as the Bautista Creek Debris Basin near Hemet, completed in 1961.

In some areas in and adjacent to Riverside County special spreading and percolation basins are used to facilitate recharge of groundwater basins with water which might otherwise be lost to the sea.

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To supplement the general^{ly} deficient native water supplies of the coastal basins of southern California two Colorado River aqueduct systems have been constructed and in 1965, county officials hope that an additional supply will be available some time in the 1970's from the distribution system of the Feather River Project.

The Colorado River Aqueduct was started in December, 1932 and completed in June, 1941. From the Intake at Parker Reservoir to the terminal storage and water conservation basin of Lake Mathews in western Riverside County, the aqueduct comprises 92 miles of tunnels 16 feet in diameter, 63 miles of concrete-lined canal, 55 miles of concrete lined conduits, 29 miles of inverted siphons totaling 144 in number, and 321 miles of power lines from Hoover Dam to power 5 pumping plants of 9 pumps each. The Colorado River Aqueduct serves portions of six counties including Riverside County. In Riverside County the area served is included in two water districts known as the Western Municipal Water District and the Eastern Municipal Water District. The Western Municipal Water District comprises Riverside, Elsinore, Corona, and some unincorporated areas. The Eastern Municipal Water District includes Hemet, Perris, San Jacinto and surrounding unincorporated areas.

Irrigation water is imported to the Coachella Valley through the Coachella Canal. This canal was built during the late 30's and early 40's. It draws water from the All American Canal which heads at Imperial Dam at the southeastern edge of Imperial County. The Coachella Canal extends from the southeast corner of Imperial Valley northwest along the northeast side of the Imperial and Coachella valleys to the northwest edge of Indio. From Indio the canal water is delivered as far southwest as the Oasis area through the Oasis Lateral.

The Palo Verde Valley is served by the Palo Verde Irrigation District. This district's water is drawn from the Colorado River at Palo Verde Dam about 10 miles north of Blythe. The Palo Verde Irrigation District has established water rights dating back to 1837. Between 1908 and 1935 the District irrigated all cultivated land within 90% of its gross valley area by gravity from the river. Following the construction, in 1942, of Headgate Rock Dam, below Parker Dam, the desilted water of the Colorado River began to degrade the river bed. The water level dropped and the District had to install pumps. The U.S. Government constructed a temporary rock weir in 1945 to maintain the water level at the canal intake. By 1958 a permanent dam (Palo Verde Dam) was built about 1,000 feet downstream from the loose rock weir. A stable head is now maintained for the district's irrigation system.

Wollastonite

Wollastonite

Deposits of wollastonite of varying purity are exposed in extensive areas in the Big Maria and Little Maria Mountains 16 to 20 miles northwest of Blythe (fig. ___/). Wollastonite of high purity forms pods which range from a few inches to as much as 1,800 feet in maximum length. The most extensive wollastonite body appears to form the core of a shallow anticline plunging west-northwest on the west side of the Big Maria Mountains (Troxel, 1957, p. 693, 694). The mineralization is probably a result of dynamo-thermal metamorphism.

Most of the area underlain by wollastonite-bearing rocks is covered by placer claims of U. S. Gypsum Co., Midland, and California Limestone Products, Blythe. The latter firm has tentatively explored a deposit in the Little Maria Mountains with plans for its ultimate use as a raw material at their rockwool plant of Woolstone Inc., north of Blythe.

The principal use, to date (1961), of wollastonite from the Maria Mountains is for decorative rock. Because float fragments of the material weather with a directional grain, in shades of gray and brown, the material has been marketed under the trade name of "Driftwood Stone". Jontz Stone Co., 185648 E. Highway 60-70, Blythe and Lawrence Johnson, Mineral Exploit Co., P.O. Box 821, Blythe, were marketing this rock in 1961.

The float fragments of weathered wollastonite are gathered from hillsides and alluvial surfaces, trucked to Blythe and sold to dealers.

Although production figures were not obtained the popularity of the rock suggests that a large tonnage has been marketed, mostly in the Los Angeles area and possibly east to the Phoenix area.

Limited amounts of wollastonite have been used as a ceramic raw material in California but industry demands have thus far been met by wollastonite from a deposit in New York State (Troxel, 1957, p. 697). Consistency of grade and milling characteristics have yet to be established for the Riverside County material described above.

Bibliography

BIBLIOGRAPHY

- Allen, A. W., 1923, Crushing 2,500 tons of rock per shift at Corona, California: Eng. and Min. Jour. Press, vol. 116, no. 21, Nov. 24, p. 887-890.
- Allen, Clarence R., 1954, Geology of the north side of San Gorgonio Pass, Riverside County: in California Div. Mines Bull. 170, map sheet no. 20.
- Allen, Clarence R., 1957, San Andreas Fault zone in San Gorgonio Pass, southern California: Geol. Soc. America Bull., vol. 68, p. 315-350, 3 figs., 6 pls.
- Aubury, Lewis E., 1905, Copper resources of California: California State Mining Bur., Bull. 23, p. 255-258.
- Aubury, Lewis E., 1906, Structural and industrial materials of California: California Min. Bur. Bull 38, 412 pp.
- Aubury, Lewis E., 1908, Copper resources of California: California State Min. Bur., Bull. 50, p. 340-343.
- Axelrod, D. I., 1937, A Pliocene flora from the Mount Eden Beds, southern California: Carnegie Inst. Wash., pub. 476, p. 125-183.

- Babcock, James Nissen, 1961, Geology of a portion of the Pinion Well quadrangle, Riverside County, California: unpub. Master's thesis deposited in the geology library, Univ. California Los Angeles.
- Bailey, Gilbert E., 1902, The saline deposits of California: California Min. Bur. Bull. 24, p. 122-126.
- Bailey, Thomas L. and Jahns, Richard H., 1954, Geology of the Transverse Range Province, southern California: in California Div. Mines Bull. 170, chap. II, p. 83-106, pl. 4.
- Bateman, Paul C. and Irwin, William P., 1954, Tungsten in southeastern California: in California Div. Mines Bull. 170, chap. VIII, p. 38.
- Bedford, R. H., and Johnson, F. T., 1946, Survey of tin in California: U.S. Bur. Mines Rept. Inv. 3876, 14 p.
- Benedict, W. de L., 1890, The San Jacinto (California) tin mines: Eng. and Mining Jour., vol. 50, p. 450-453.

- Blake, W. P. (Lt. R. S. Williamson), 1856, Explorations
in California for railroad routes, 1853; 33d Cong.,
2nd sess., S. Ex. Doc. No. 78, vol. 5, 310 p.
- Bookman, Max, and others, 1956, Santa Margarita River
Investigation: California Div. of Water Resources,
Bull. 57, 272 p., 30 pl.
- Bowen, Oliver E. Jr., 1950, Lime and limestone: California
Div. Mines Bull. 156, p. 175.
- Bowen, Oliver E. Jr., 1957, Cement: in California Div.
Mines Bull. 176, p. 113-120.
- Bowen, Oliver E. Jr., 1957, Limestone, dolomite, and lime
products: in California Div. Mines Bull. 176,
p. 293-306.
- Bowen, Oliver E., and Gray, Clifton H. Jr., 1962, The
portland cement industry in California, 1962 (part 2):
California Div. Mines and Geology Min. Inf. Service
vol. 15, no. 8, p. 7, 10-11.
- Bradley, Walter W., and others, 1918, Manganese and chromium
in California: California Min. Bur. Bull. 76, p. 54-59.

Bradley, Walter W., 1923, California mineral production
for 1922: California Min. Bur. Bull. 93, p. 95 photo.

Bradley, Walter W., 1925, Magnesite in California: Calif-
ornia Min. Bur. Bull. 79, p. 61-65.

Bramcamp, Richard A., 1935, Stratigraphy and molluscan
fauna of the Imperial Formation of San Geronio Pass,
California: unpub. PhD thesis deposited in the
geology library, Univ. California, Berkeley.

Braun, Lewis T., 1950, Abrasives: California Div. Mines
Bull., 156, p. 113.

Braun, Lewis T., 1950, Coal: California Div. Mines Bull.
156, p. 64.

Brown, John S., 1922, Fault features of Salton Basin:
California Jour. Geol. vol. 30, no. 3, p. 217-226.

Brown, John S., 1923, The Salton Sea region, California,
U.S. Geological Survey Water Supply Paper 497, 292 p.
19 pls.

2
Brown, M. C., 1957, Coronita Ranch sand deposit: unpub.
private report, 3 p.

Bucky, Philip B., 1945, Block caving at the Crestmore
mine: Explosives Eng., vol. 23, no. 3, May-June
1945, p. 108-110, 114-124.

Burchard, Ernest F., 1948, Summary of the iron-ore situ-
ation in California: in Iron Resources of California,
California Div. Mines Bull. 129, p. 219-220.

2
Burnham, C. Wayne, 1954, Contact metamorphism at Crest-
more, California: in California Div. Mines Bull.
170, chap. VII, p. 61-70.

Burnham, C. Wayne, 1954, The Crestmore Hills: California
Div. Mines Bull. 170, Geologic Guide no. 5, p. 54-57.

Burnham, C. Wayne, 1959, Contact metamorphism of magnesian
limestones at Crestmore, California: Geol. Soc.
America Bull., vol. 70, p. 879-920, 6 figs., 10 pls.

Butler, A. P. Jr., Finch, W. I. Jr. and Twenhofel, W. S.,
1962, Epigenetic uranium deposits in the United
States: U.S. Geol. Survey Mineral Inv. Res. Map
MR-21.

Buwalda, J. B., and Stanton, W. C., 1930, Geological
events in the history of the Indio Hills and
Salton Basin, southern California: Science, vol.
71, p. 104-106.

California Division of Mines, 1952, Manganese operation
in Riverside County: Mineral Inf. Service, vol. 5,
no. 7, p. 10.

California Division of Mines, 1954, Manganese mining in
southern California: Mineral Inf. Service, vol. 7,
no. 3, p. 5.

California Division of Mines, 1954, Glass sand in Calif-
ornia: Mineral Inf. Service, vol. 7, no. 6, p. 2.

Campbell, Ian, 1954, Contact metamorphism in southern
California: in California Div. Mines Bull. 170,
chap. VII, p. 51-60.

Carlisle, Donald and others, 1954, Base metal and iron
deposits of southern California: in California Div.
Mines Bull. 170, chap. VIII, p. 41-49.

Caughey, John Walton, 1948, Gold is the cornerstone:
Univ. California Press, 321 p.

Ceramic News, 1956, Clay is where you find it -- the story
of Gladding, McBean's Bedford deposit: Ceramic News,
vol. 5, no. 11, Nov. 1956, p. 21-22.

Ceramic News, 1956, Gladding, McBean accelerate operations
via \$8,000,000 program: Ceramic News, vol. 5, no. 8,
August 1956, p. 17.

Chesterman, Charles W., 1950, Bismuth: California Div.
Mines Bull. 156, p. 291-293.

Chesterman, Charles W., 1950, Deposits of perlite: Calif-
ornia Div. Mines Bull. 156, p. 200.

Chesterman, Charles W., 1957, Bismuth: in California Div.
Mines Bull. 176, p. 79-81.

Chesterman, Charles W., 1957, Fluorspar: in California
Div. Mines Bull. 176, p. 201-204.

Clark, William B. and Carlson, Denton W., 1957, Quartz-
ite and quartz: in California Div. Mines Bull. 176,
p. 463-466.

Cleveland, George B., 1957, Aluminum: in California
Div. Mines Bull. 176, p. 30, 131-152.

Cockerell, T. D. A., 1945, The Colorado Desert of California,
its origin and biota: Kansas Acad. Sci. Trans.,
vol. 48, no. 1, p. 1-39.

Cockerell, T. D. A., 1946, The age of Lake Cahuilla:

Science, vol. 103, no. 2669, p. 235.

Cooney, Robert L., 1956, The mineralogy of the Jensen and Henshaw quarries, near Riverside, California: unpub.

Master's thesis deposited in the geology library,

Univ. California Los Angeles.

Cloudman, H. E., and others, 1917 [1919], San Bernardino County: California Min. Bur. Rept. 15, p. 775-899.

Crawford, J. J., 1894, Riverside County: California Min. Bur. Rept. 12, p. 220-225.

Crawford, J. J. 1896, Riverside County: California Min. Bur. Rept. 13, p. 310-314.

Crittenden, M. S., and Pavlides, L., 1962, Manganese in the United States: U.S. Geol. Survey Mineral Inv. Res. Map MR-23.

Crosby, James W., and Hoffman, Samuel R., 1951, Fluorspar in California: California Jour. Mines and Geol., vol. 47, p. 632-633.

Crossman, H. H., 1890: Mining and Scientific Press,

Sept. 6, 1890 (San Francisco).

Crowell, John C. and Susuki, Takeo, 1959, Eocene stratigraphy and paleontology, Orocochia Mountains, southern California: Geol. Soc. America Bull., vol. 70, no. 5, p. 581-592.

Crowell, John C. and Walker, W. R., 1962, Anorthosite and related rocks along the San Andreas fault southern California: Univ. California Pubs. in Geol. Sci., vol. 40, no. 4, pp. 219-288.

Dale, Robert F., 1959, Climates of the states - California: U.S. Dept. of Commerce Weather Bureau series, Climatology of the U.S., no. 60-4, 37 p.

Daly, John W., 1931, The geology and mineralogy of the limestone deposits at Crestmore, Riverside County, California: unpub. Master's thesis deposited at the geology library, Calif/ ornia Inst. Tech., Pasadena, California.

Dana, Samuel Trask and Kruger, Myron, 1958, California lands, ownership, use, and management: The American Forestry Assoc., Washington, D.C., 308 p.

Darton, N. H., 1933, Guidebook of the western United States, pt. F, Southern Pacific Lines: U.S. Geological Survey Bull. 845, 304 p., 49 pls., 29 route maps.

Davis, Fenelon F., 1957, Manganese in California: Div. of Mines Bull. 176, p. 325-339.

Davis, Fenelon F., and others, 1962, The California minerals industry: Mineral Inf. Service, vol. 15, no. 2, p. 3,4.

Dickey, H. E., and Porter, L. C., 1952, Investigations of construction materials for projects in Region 3: Unpub. Rept. U.S. Dept. Interior, Bureau of Reclamation, Design and Construction Div., Engineering Laboratories Br., Denver Colorado Laboratory Report No. C-623. Typed rept. 13 p. on file California Div. Mines.

Dibblee, T. W., Jr., 1954, Geology of the Imperial Valley region, California: California Div. Mines Bull. 170, p. 21-28.

Dickerson, R. E., 1914, The Martinez and Tejon Eocene
and associated formations of the Santa Ana Mountains:
Univ. California, Dept. Geol. Sci. Bull., vol. 8,
no. 11, p. 257-274.

Dietrich, Waldemar Fenn, 1928, The clay resources and
the ceramic industry of California: California
Div. Mines and Mining, Bull. 99, 383 pp.

Draper, Weldon, 1944, Report on the examination of the
Middlesworth clay properties, Riverside County,
California: unpub. private report, Kaiser Steel
Corp., 11 p., map.

Dudley, Paul H., 1935, Geology of a portion of the Perris
Block, southern California: California Div. Mines
Rept. 31, p. 487-506.

Dudley, Paul H., 1936, Physiographic history of a portion
of the Perris Block, southern California: Jour.
Geol., vol. 44, p. 358-378.

Dunn, J. E., and others, 1921, Reconnaissance soil survey
of the central southern area, California: U.S. Depart-
ment of Agriculture, Bureau of Soils, (advance sheets
- field operations of the Bureau of Soils, 1917).
136 p., two maps.

Durham, J. Wyatt, 1954, The marine Cenozoic of southern California: in California Div. Mines Bull. 170, chap. III, p. 23-31.

Durrenburger, R. W., Byron, W. G., and Kimura, J. C., 1957, Patterns on the land: Brewster Publishing Co., Los Angeles, 59 p.

Eakle, A. S., 1917, Minerals associated with crystalline limestone at Crestmore, Riverside County, California: Univ. California Bull. Dept. Geol. Sci., vol. 10, p. 327-360.

Eardley-Wilmot, V. L., 1937, Abrasive: in Industrial minerals and rocks, Am. Inst. Min. and Met. Eng., New York, N.Y., p. 1-58.

Eckis, Rollin P., 1930, Geology of a portion of the Indio quadrangle: unpub. Master's thesis deposited in the geology library, California Inst. Tech., Pasadena, California.

Eckis, R. W., 1934, South coastal-basin investigation;
geology and ground water storage capacity of valley
fill: California Dept. Public Works Pub. Div.
Water Resources Bull. 45, p. 76, 178-181, plates
C, D.

Eldridge, G. H., and Arnold, R., 1907, The Santa Clara
Valley, Puente Hills, and Los Angeles oil districts,
southern California: U. S. Geol. Survey Bull. 309,
p. 103-106.

Engel, Rene, 1933, Geochemical properties of the waters
of the Elsinore quadrangle: unpub. PhD thesis
deposited in the geology library, California Inst.
Tech., Pasadena, California.

English, H. Duncan, 1953, The geology of the San Timoteo
Badlands, Riverside County, California: unpub.
Master's thesis deposited in the geology library,
Pomona College, Claremont, California.

Engel, Rene, 1959, Geol. of Lake Elsinore Quad., Calif.,
Calif. Div. Mines Bull. 146, 154 p., 7 pl.

English, W. A., 1926, Geology and oil resources of the
Puente Hills region, southern California: U.S.
Geol. Survey Bull. 768, p. 1-69.

Eric, John H., 1948, Tabulation of copper deposits of
California: in Copper in California, California
Div. Mines Bull. 144, p. 291-300.

Explosives Engineer, Oct. 1929, Ref. on the Ormand quarry.

Fairbanks, H. W., 1893, Geology of San Diego County; also
portions of Orange and San Bernardino Counties:
California Min. Bur. Rept. 11, p. 76-120.

Fairbanks, H. W., 1897, The tin deposits of Temescal,
southern California: Am. Jour. Sci., 4th ser., vol. 4,
p. 39-42.

Fischer, R. P., 1962, Vanadium in the United States: U.S.
Geol. Survey Mineral Inv. Res. Map MR-16.

Fish, J. L., 1953, Geology of a portion of the western
Perris fault block, near Dawson Canyon: unpub.
senior thesis deposited in the geology library,
Pomona College, Claremont, California.

Fraser, Donald M., 1931, Geology of San Jacinto quadrangle
south of San Geronio Pass, California: California
Div. Mines Rept. 27, p. 494-540.

Free, E. E., 1914, Sketch of the geology and soils of the
Cahuilla basin: Carnegie Inst. Washington, pub. 193,
p. 21-33.

Frick, C., 1921, Extinct vertebrate faunas of the badlands
of Bautista Creek and San Timoteo Canon, southern
California: Univ. California Pub., Dept. Geol. Bull.,
vol. 12, p. 283-288.

Gale, H. S., 1916, Late developments of magnesite deposits
in California and Nevada: U.S. Geological Survey
Bull. 540, p. 483-520.

Gay, Thomas E. Jr., 1957, Iron industries: in California
Div. Mines Bull. 176, p. 245-274.

Gay, Thomas E. Jr., 1957, Sand and gravel: in California
Div. Mines Bull. 176, p. 495-520.

Gay, Thomas E. Jr., 1957, Specialty sands: in California
Div. Mines Bull. 176, p. 547-564.

Gay, Thomas E. Jr., 1957, Stone, crushed and broken: in
California Div. Mines Bull. 176, p. 565-590.

Gildersleeve, Benjamin, 1962, Magnesite and brucite in the
United States: U.S. Geol. Survey Mineral Inv. Res.
Map MR-27.

Gillies, Warren Douglas, 1958, The geology of a portion
of Cottonwood Springs quadrangle, Riverside County,
California: unpub. Master's thesis deposited in
the geology library, Univ. California Los Angeles.

Goldman, Harold B., 1957, Antimony: in California Div.
Mines Bull. 176, p. 36, Fig. 1.

Goldman, Harold B., 1957, Stone, dimension: in California
Div. Mines Bull. 176, p. 591-606.

Goodwin, J. Grant, 1957, Lead and zinc in California:

California Jour. Mines and Geology, vol. 53, p. 351-724.

Goodyear, W. A., 1888, Coal - San Diego County: California Min. Bur. Rept. 7, p. 174-178.

Goodyear, W. A., 1888, San Diego County: California Mining Bur. Rept. 8, p. 506, 516-528.

Goodyear, W. A., 1890, San Diego County: California Min. Bur. Rept. 9, p. 139-154.

Gray, Cliffton H. Jr., 1954, Geology of the Corona-Elsinore Murietta area, Riverside County: in California Div. Mines Bull. 170, map sheet no. 21.

Gray, Cliffton H. Jr., 1957, Geology of the Corona South quadrangle, northern Peninsular Ranges, California: Geol. Soc. America Bull., vol. 68, no. 12, pt. 2, p. 1828 (abstract).

Gray, Cliffton H. Jr., 1957, Tin: in California Div. Mines Bull. 176, p. 641-646.

Gray, Cliffton H. Jr., 1961, Geology of the Corona South quadrangle and the Santa Ana Narrows area Riverside, Orange, and San Bernardino Counties, California and mines and mineral deposits of the Corona South quadrangle, Riverside and Orange Counties, California: California Div. Mines Bull. 178, 120 p. 4 pls.

Hadley, Jarvis B., 1948, Iron-ore deposits in the eastern part of the Eagle Mountains Riverside County, California: in California Div. Mines Bull. 129, p. 3-24.

Hamilton, Warren, 1960, Pliocene(?) sediments of salt water origin near Blythe, southeastern California: U.S. Geol. Survey Prof. Paper 400-B, p. 276-277.

Hamilton, Warren, 1960, Structure in the Big Maria Mountains of southern California: U.S. Geol. Survey Prof. Paper 400-B, p. 277-278.

Hanks, Henry G., 1884, History of early gold discoveries in California: California State Mining Bur. Rept. 4, p. 217-218.

Hanks, Henry G., 1884, The minerals of California:

California State Mining Bur. Rept. 4, p. 120-122.

Harder, E. C., 1910, The gypsum deposits of the Palen
Mountains, Riverside County, California: U.S.

Geol. Survey Bull. 430, p. 407-416.

Harder, Edmund Cecil, 1912, Iron-ore deposits of the
Eagle Mountains, California: U.S. Geol. Survey
Bull. 503, 81 p.

Hays, W. H., 1951, Geology of Cottonwood Springs and
part of Coachella quadrangles: unpub. PhD thesis,
Yale.

Hazzard, John C., Gardner, Dion L., and Mason, John F.,
1938, Mesozoic(?) metavolcanic and sedimentary
rocks in San Bernardino and Riverside Counties,
California: Geol. Soc. America, Proc. p. 279.

Henderson, Chas. W., 1934, Gold and Silver: in Minerals
Yearbook 1934, U.S. Bureau of Mines, p. 25-52.

Henry, Darold John, 1947, Wiley Well district, California,
a mecca for the collector: Mineralogist, vol. 15,
no. 4, p. 171-176, illus., incl. index map.

Hess, Frank L., 1908, The magnesite deposits of California:
U.S. Geol. Survey Bull. 355, p. 38-39, pl. VIII, A.

Hewett, D. F., and others, 1936, Mineral resources in the
region around Boulder Dam: U.S. Geol. Survey Bull.
871, 197 p., map sheets 1, 2, and 3.

Hewett, D. F., 1954, A fault map of the Mojave Desert
region, California: Div. Mines Bull. 170, chap. IV,
p. 15-18, pl. I.

Hill, James H., 1912, The mining districts of the western
United States: U.S. Geol. Survey Bull. 507, 309 p.

Hill, James H., 1923, Clay deposits of the Alberhill Coal
and Clay Company: California Min. Bur. Rept. 19,
p. 185-210.

Hilton, G. S., 1950, Geology of a portion of the north-eastern Santa Ana Mountains: unpub. Master's thesis deposited in the geology library, Pomona College, Claremont, California.

Hinds, Norman E. A., 1952, Evolution of the California landscape: California Div. Mines Bull. 158, 240 p.

Holliday, Robert W., 1960, Tungsten: in Mineral Facts and Problems, U. S. Bur. Mines Bull. 585, p. 903-917.

Hoppin, Richard A., 1954, Geology of the Palen Mountains gypsum deposit Riverside County, California: California Div. Mines Special Rept. 36, 25 p. 1 pl.

Hudson, F. S., 1918, (~~in Trask, Parker D., 1950,~~) Geologic descriptions of the manganese deposits of California /Riverside County/; ⁱⁿ _^ California Div. Mines Bull. 152, p. 176-185.

- Illingworth, L. R., and others, 1956, Santa Margarita River investigation: California Dept. Public Works Pub. Div. Water Resources Bull. 57, 273, p., 30 plates.
- Ingram, Stuart H., 1949, Roofing granules in the southwest: California Jour. Mines and Geology, vol. 45, p. 457.
- Irving, E. M., 1935, The geology of a portion of the Corona and Riverside quadrangles, near Corona, California: unpub. Master's thesis deposited in the geology library, Univ. California Los Angeles.
- Jaffe, Howard W., and others, 1959, Lead - alpha age determinations of accessory minerals of igneous rocks (1953-1957), U.S. Geol. Survey Bull. 1097-B, 148 p.
- Jahns, Richard H., 1954, Northern part of the Peninsular Range Province: California Div. Mines Bull. 170, Geologic guide no. 5, p. 18-26, 44-59, maps 4, 5, 6, 11.
- Jahns, Richard H., 1954, Investigations and problems of southern California geology: in California Div. Mines Bull. 170, chap. I, p. 5-29.

Jahns, Richard H., 1954, Geology of the Peninsular Range Province, southern California and Baja California: in California Div. Mines Bull. 170, chap. II, Contribution 3, p. 29-52, pl. 3.

Jahns, Richard H., 1954, Pegmatites of southern California: in California Div. Mines Bull. 170, chap. VII, p. 37-50.

Jamison, Conrad C., 1960, The growth and economic stature of San Bernardino and Riverside Counties: Research Dept. Security First National Bank, Los Angeles, 104 p.

Jenkins, Olaf P., 1948, Geologic formations and economic development of the oil and gas fields of California: California Div. Mines Bull. 118, p. 653.

Jenkins, Olaf P., et al. 1943, Manganese in California: California Div. of Mines Bull. 125, p. 82-83, 154.

Jennings, C. W., and Hart, E. W., 1956, Exploratory wells drilled outside of oil and gas fields in California to December 31, 1953: California Div. Mines Special Rept. 45, p. 63-64.

Jennings, Charles W., 1957, Coal: in California Div.

Mines Bull. 176, p. 153-164.

Johnson, A. C. and Ricker, Spangler, 1948, Summary of
investigations of the iron-ore deposits of California:
in Iron Resources of California, California Div.

Mines Bull. 129, p. 236.

Jones, Edward L., 1920, Deposits of manganese ore in
southeastern California: U.S. Geol. Survey Bull.
710, pt. 1, p. 185-200, pl. 9.

Kinkle, A. R. Jr. and Peterson, N. P., 1962, Copper in
the United States: U.S. Geol. Survey Mineral
Inv. Res. Map MR-13.

Koenig, James B., 1954, Index to geologic maps of Calif-
ornia 1957-1960: California Div. Mines and Geol.
Special Rept. 52A, 60 p.

Koschmann, A. H. and Bergendahl, M. H., 1962, Gold in
the United States: U.S. Geol. Survey Mineral Inv.
Res. Map MR-24.

Kunkel, Fred, 1963, Hydrologic and geologic reconnaissance
of Pinto Basin Joshua Tree National Monument, River-
side County, California: U.S. Geol. Survey Water-
Supply Paper 1475-0, p. 537-561.

Larsen, Esper S. Jr., 1948, Batholith and associated rocks of Corona, Elsinore, and San Luis Rey quadrangles, southern California: Geol. Soc. of America Memoir 29, 182 p.

Larsen, Esper S. Jr., 1951, Crystalline rocks of the Corona, Elsinore, and San Louis Rey quadrangles, southern California: California Div. Mines Bull. 159, 136 p.

Larsen, Esper S. Jr., 1954, The batholith of southern California: in California Div. Mines Bull. 170, chap. VII, p. 25-30.

Larsen, Esper S. Jr., Gottfried, D., Jaffe, H., and Waring, C. L., 1954, Age of the southern California, Sierra Nevada, and Idaho batholiths: Geol. Soc. America Bull., vol. 65, no. 12, pt. 2, p. 1277.

Lee, Willis T. and Johannsen, Albert, 1908, Geologic reconnaissance of a part of western Arizona, U.S. Geol. Survey Bull. 352, 96 p., 11 pls.

Lemar, Donald Lee, 1959, Geology of the Corona area,
Orange, Riverside, and San Bernardino Counties,
California: unpub. Master's thesis deposited in
the geology library, Univ. California Los Angeles.

Lemmon, D. M., and Tweto, O. L., 1962, Tungsten in the
United States: U.S. Geol. Survey Mineral Inv. Res.
Map MR-25.

Loel, W., and Corey, W. H., 1932, The Vaqueros Formation,
lower Miocene of California. I Paleontology: Univ.
California, Dept. Geol. Sci. Bull., vol. 22, no. 3,
p. 31-410.

Logan, Clarence A., 1947, Limestone in California: Cal-
ifornia Jour. Mines and Geology, vol. 43, p. 270-274.

Long, Albert E., and Obert, Leonard, 1958, Block caving
in limestone at the Crestmore mine, Riverside Cement
Co., Riverside, California: U.S. Bur. Mines Inf.
Circ. 7838, 21 p.

Longwell, Chester R., 1954, History of the lower Colorado River and the Imperial depression: in California Div. Mines Bull. 170, chap. V, p. 53-56.

Mackevett, Edward M., 1951, Geology of the Jurupa Mountains, San Bernardino and Riverside Counties, California: California Div. Mines Special Rept. 5, 14 p., 1 pl.

Maclellan, Donald D., 1936, Geology of the east Coachella Tunnel of the Metropolitan Water District of southern California: unpub. PhD thesis deposited in the geology library, California Inst. of Tech., Pasadena, California.

Mann, John F. Jr., 1955, Geology of a portion of the Elsinore Fault Zone, California: California Div. Mines Special Rept. 43, 22 p.

McMillan, W. D., 1943, Eagle Mountains iron district, Riverside County, California: U.S. Bur. Mines War Minerals Rept. 97, 44 p.

Megaphone, 1951, In Temescal Canyon: Minnesota Mining and Manufacturing Co., 3 M Megaphone, vol. 10, no. 9, Feb. 1951, p. 6-7.

Mendenhall, W. C., 1909, Ground waters of the Indio region,
California: U.S. Geol. Survey Water-Supply Paper 225,
56 p., 12 pls.

Merriam, Charles W., 1954, Rocks of Paleozoic age in south-
ern California: in California Div. Mines Bull. 170,
chap. III, p. 14.

Merrill, F. J. and Waring, Clarence A., 1917 [1919], Mines
and mineral resources of Riverside County: California
Min. Bur. Rept. 15, p. 522-589.

Miller, W. J., 1934, Geology of the western San Gabriel
Mountains of California: Univ. Calif/^{ornia} at Los Angeles
Publ., Math. and Phys. Sci., vol. 1, no. 1, p. 1-114.

Miller, William J., 1938, Precambrian and associated rocks
near Twentynine Palms, California: Geol. Soc. America
Bull. vol. 49, no. 3, p. 417-446.

Miller, William J., 1944, Geology of Palm Springs-Blythe
strip, Riverside County, California: California Div.
Mines, Rept. 40, p. 11-72.

Miller, William J., 1946, Crystalline rocks of southern
California: Geol. Soc. America Bull., vol. 57,
p. 457-542.

Mining and Scientific Press (San Francisco)

- 1885, vol. 51, no. 7, p. 120
- 1886, vol. 52, no. 6, p. 100
- 1891, vol. 62, no. 13, p. 196
- 1891, vol. 63, no. 9, p. 132
- 1893, vol. 67, no. 25, p. 397
- 1894, vol. 68, no. 11, p. 173
- 1894, vol. 69, no. 25, p. 394
- 1895, vol. 70, no. 7, p. 106; 20, p. 186; 24, p. 382
- 1895, vol. 71, no. 7, p. 106; 12, p. 186; 24, p. 390
- 1896, vol. 72, no. 1, p. 9
- 1897, vol. 75, no. 15, p. 342
- 1898, vol. 76, no. 1, p. 10; 16, p. 422; 18, p. 469
- 1898, vol. 77, no. 23, p. 557; 24, p. 585; 25, p. 611.
- 1899, vol. 78, no. 10, p. 267; 20, p. 538
- 1899, vol. 79, no. 5, p. 123; 11, p. 289; 27, p. 750
- 1900, vol. 80, no. 18, p. 494
- 1900, vol. 81, no. 6, p. 159; 9, p. 255
- 1901, vol. 82, no. 8, p. 107
- 1909, vol. 99, no. 19, p. 635
- 1910, vol. 101, no. 8, p. 253
- 1911, vol. 102, no. 2, p. 119

Murdoch, Joseph, 1936, Andalusite in pegmatite: American Mineralogist, vol. 21, p. 68-69.

Murdoch, Joseph and Webb, Robert W., 1954, Minerals in southern California: in California Div. Mines Bull. 170, chap. VII, p. 6-12.

Murdoch, Joseph, and Webb, Robert W., 1956, Minerals of California: California Div. Mines Bull. 173, 452 p.

Murdoch, Joseph and Webb, Robert W., 1959, Minerals of California, Supplement to: California Div. Mines Bull. 173, 64 p.

Murdoch, Joseph, 1961, Crestmore, past and present: American Mineralogist, vol. 46, nos. 3 and 4 (part 1) p. 245-257.

Murphy, F. Mae, 1930, Dumortierite in Riverside County: American Mineralogist, vol. 15, p. 79-80.

Nelson, J. W., and others, 1917, Soil survey of the Riverside area, California: U.S. Dept. of Agriculture, Bureau of Soils, (Advance Sheets - Field Operations of the Bureau of Soils), 88 p. with map.

Newman, M. A., 1922 1923 Los Angeles field division, Riverside County: California Min. Bur. Rept. 18, p. 221-222.

Newman, M. A., 1924, Unpublished report on Black Eagle mine, 6 p.

Noble, L. F., 1932, The San Andreas rift in the desert region of southern California: Carnegie Inst. Washington Yearbook 31, p. 355-363.

Norman, L. A. Jr., 1950, Tin: California Div. Mines Bull. 156, p. 350, 351.

Olson, J. C., and Adams, J. W., 1962, Thorium and rare earth in the United States: U.S. Geol. Survey Mineral Inv. Res. Map MR-28.

Orcutt, Charles Russell, 1890, The Colorado Desert: California Min. Bur. Rept. 10, p. 899-919.

Packard, E. L., 1916, Faunal studies in the Cretaceous of the Santa Ana Mountains of southern California: Univ. California, Dept. Geol. Sci. Bull., vol. 9, no. 12, p. 137-159.

Packard, E. L., 1922, New species from the Cretaceous of the Santa Ana Mountains, California: Univ. California, Dept. Geol. Sci. Bull., vol. 13, no. 10, p. 413-462.

Page, L. R., and Thayer, T. P., 1945, The Temescal tin district, Riverside County, California: U.S. Geol. Survey unpub. rept., 24 p., 13 figs. (on open file California Div. Mines and Geology Library).

Pampeyan, E. H., 1952, Geology of Cajalco area, Riverside County, California: unpub. Master's thesis deposited in the geology library, Pomona College, Claremont, California.

Papke, K. G., and others, 1957, Special project group report on iron-titanium occurrence: Unpub. private report, Southern Pacific Company, 6 p.

- Patchick, Paul F., 1960, A rare earth pegmatite near Nuevo, California: Rocks and Minerals, vol. 35, no. 7/8, p. 323-327.
- Persons, Hubert C., 1955, Mine limestone 1500 feet underground for cement manufacture: Rock Products, Sept. 1955, p. 76-78.
- Popence, W. P., 1937, Upper Cretaceous mollusca from southern California: Jour. Paleontology, vol. 11, no. 5, p. 379-402.
- Popence, W. P., 1941, The Trabuco and Baker conglomerate of the Santa Ana Mountains: Jour. Geology, vol. 49, no. 7, p. 738-752.
- Popence, W. P., 1954, Mesozoic formations and faunas, southern California and northern Baja California: in California Div. Mines Bull. 170, chap. III, p. 15-21.
- Popence, Frank Wallace, 1960, Geology of the southeastern portion of the Indio Hills, Riverside County, California: unpub. Master's thesis deposited in the geology library, Univ. California Los Angeles.

Pray, Lloyd C., 1937, Rare earth elements: in California
Div. Mines Bull. 176, p. 472.

Price, Maurice, 1953, Geology of southeastern Puente
Hills: unpub. Master's thesis deposited in the
geology library, Pomona College, Claremont, Calif-
ornia.

Proctor, Richard J., 1958, Geology of the Desert Hot
Springs area, Little San Bernardino Mountains,
California: unpub. Master's thesis deposited in the
geology library, Univ. California Los Angeles.

Reed, R. D., 1929, Sespe formation, California: Am. Assoc.
Petroleum Geologists Bull., vol. 13, pt. 1, p. 489-507.

Richter, C. F. and others, 1956, Desert Hot Springs earth-
quake of December 4, 1948, and its aftershocks
[abstract]; Bull. Geol. Soc. America, vol. 67, p. 1780.

Ricketts, A. H., 1931, American mining law, with forms
and precedents: California Div. Mines Bull. 98, 811 p.

Riverside Planning Commission, 1960, Zoning ordinance,
County of Riverside: Ordinance no. 343 (as amended),
31 p.

Robinson, W. W., 1957, The story of Riverside County:
Title Insurance and Trust Co., Los Angeles, 51 p.

Robotham, C. A., 1934, Mining limestone by a caving
method at Crestmore mine of the Riverside Cement
Co., Crestmore, California: U.S. Bur. of Mines
Inf. Circ. 6735, 20 p.

Rogers, John J. W., 1954, Geology of a portion of Joshua
Tree National Monument, Riverside County: Calif-
ornia Div. Mines Bull. 170, Map Sheet no. 24.

Rogers, John J. W., 1958, Textural and spectrochemical
studies of the White Tank quartz monzonite, Calif-
ornia: Geol. Soc. America Bull., vol. 69, no. 4,
p. 449-464.

Rogers, John J. W., 1961, Igneous and metamorphic rocks
of the western portion of Joshua Tree National Monu-
ment, Riverside and San Bernardino Counties, California:
California Div. Mines Special Rept. 68, 26 p., 1 pl.

- Rogers, B. H., 1959, Geologic map and sections of the southern Temescal Valley region: California Div. Mines Bull. 146, pl. 5.
- Rolker, C. M., 1895, The production of tin in various parts of the world; U. S. Geol. Survey 16th Ann. Rept., pt. 3, p. 537.
- Rollins, Robert Z., 1951, Agricultural gypsum: in Minerals Useful to California Agriculture, California Div. Mines Bull. 155, p. 105-116.
- Ryder, M. S., 1942, Geology of El Sobrante de San Jacinto along Temescal Wash, southern California: unpub. senior thesis deposited in the geology library, Pomona College, Claremont, California.
- Sampson, R. J. and Tucker, 1931, Feldspar, silica, andalusite and cyanite deposits of California: California Div. Mines Rept. 27, p. 245-486.
- Sampson, R. J., 1935, Mineral resources of a portion of the Perris Block, Riverside County, California: California Div. Mines Rept. 31, p. 507-521.

Sampson, R. J. and Tucker, W. B., 1942, Mineral resources of Imperial County: California Div. Mines Rept. 38, p. 140-143.

Saul, Richard B., 1961, New peat deposit: Mineral Inf. Service, vol. 14, no. 10, p. 8-9.

Saul Richard B., 1962, United States mineral and location monuments: Mineral Inf. Service, vol. 15, no. 10, p. 1-10.

Savage, Donald E. and others, 1954, Cenozoic land life of southern California: in California Div. Mines Bull. 170, chap. III, p. 43-57.

Scharf, David, 1935, The quaternary history of Pinto Basin: Southwest Museum Papers no. 9.

Schenck, H. G., 1935, What is the Vaqueros formation of California, and is it Oligocene: Am. Assoc. Petroleum Geologists Bull., vol. 19, p. 521-536.

Schoellhamer, J. E., and others, 1954, Geologic map of the northern Santa Ana Mountains, Orange and Riverside Counties, California: U.S. Geol. Survey Oil and Gas. Inv., Map 154.

Choellhamer, J. E., and others, 1954, Geology of the Los Angeles Basin: California Div. Mines Bull. 170, chap. II, contribution 5, pl. 1.

Schwarcz, Henry P., 1960, Sedimentary and regional metamorphism prior to intrusion of the southern California batholith: Geol. Soc. of America Bull. vol. 71, no. 12, pt. 2, abst., p. 1969.

Seastrom, Westey C., 1953, Structural geology of the Canyon Springs quadrangle, Riverside County, California: unpub. Master's thesis deposited in the geology library, Univ. Southern California, Los Angeles.

Segerstrom, Richard J., 1941, Tin in California: California Jour. Mines and Geology, vol. 37, p. 533-557.

Sharp, R. P., 1954, Some physiographic aspects of southern California: California Div. Mines Bull. 170, chap. V, p. 5-10.

Shuler, Edward Hooper, 1952, Geology of a portion of the San Timoteo Canyon Badlands near Beaumont, California: unpub. Master's thesis deposited in the geology library, Univ. California, Berkeley, California.

Silberling, N. J., and others, 1961, Upper Jurassic fossils from Bedford Canyon formation, southern California: Am. Assoc. Petroleum Geologists Bull., vol. 45, no. 10, p. 1746-1748.

Smith, J. P., 1898, Geographic relations of the Trias of California: Jour. Geology, vol. 6, p. 776-786.

Smith, Patsy Beckstead, 1960, Fossil foraminifera from the southeastern deserts: U.S. Geol. Survey Prof. Paper 400-B, p. 278-279.

Sperisen, Francis J., 1938, Gem minerals of California: California Div. Mines Rept. 34, p. 34-78.

Spurr, Gordon, 1911, Gypsum in the Maria Mountains, Riverside County: Mining World, vol. 34, p. 787-790.

Stauffer, C. R., 1946, High alumina clays of the Santa Ana Mountain region, California: U.S. Geol. Survey Strategic Minerals Inv. Map 3-197.

Stewart, K. C., and R.E., 1930, "Lower Pliocene" in eastern end of Puente Hills, San Bernardino County, California: Am. Assoc. Petroleum Geologists Bull., vol. 14, p. 1445-1450.

Stone, R. W. and others, 1920, Gypsum deposits of the western United States: U.S. Geol. Survey Bull. 697, p. 77-79.

Storms, W. H., 1892 [1893], The Gavilan mines: California State Min. Bur. Rept. 11, p. 366-367.

Strand, R. G. and others, 1958, Index to geologic maps of California to December 31, 1956: California Div. Mines Special Rept. 52, 128, p.

Sutherland, J. Clark, 1935, Geological investigation of the clays of Riverside and Orange Counties, southern California: California Div. Mines Rept. 31, p. 51-87.

Tarbet, L. A., and Holman, W. H., 1944, Stratigraphy and micropaleontology of the west side of Imperial Valley, California: Am. Assoc. Petroleum Geologists Bull., vol. 28, p. 1781-1782.

Thomas, Blakemore E., 1961, Fold structure related to basin and range topography, near Blythe, California: Geol. Soc. of America Program, Annual Meeting, abst., p. 69.

Trask, Parker D., and others, 1943, Manganese in California: California Div. Mines Bull. 125, p. 51-215.

~~Trask, Parker D., and others, 1950, Geologic description of the manganese deposits of California: California Div. Mines Bull. 152, p. 176-185.~~

Troxel, Bennie W., 1957, Abrasives: in California Div. Mines Bull. 176, p. 24, 28.

Troxel, Bennie W., 1957, Wollastonite: in California Div. Mines Bull. 176, p. 693-694.

Troxell, Harold C. and Hofmann, Walter, 1954, Hydrology of the Los Angeles region: in California Div. Mines Bull. 170, chap. VI, p. 5-12.

Tucker, W. B., 1920 [1921], Los Angeles District; By counties, [Riverside County; San Bernardino County]: California Min. Bur. Rept. 17, p. 324-332, 347-348.

Tucker, W. B., 1924, Los Angeles field division: California Min. Bur. Rept. 20, p. 46-47, 87-91.

Tucker, W. B., 1924, Los Angeles field division, [Riverside County]: California Min. Bur. Rept. 20, p. 191-196.

Tucker, W. B., 1926, Los Angeles field division: California Min. Bur. Rept. 22, p. 281-283.

Tucker, W. B. and Sampson, R. J., 1929, Los Angeles field division [Riverside County]: California Div. Mines and Mining Rept. 25, p. 468-526.

Tucker, W. B. and Sampson, R. J., 1930, Los Angeles field division [gold]: California Div. Mines Rept. 26, p. 227-229.

Tucker, W. B. and Sampson, R. J., 1931, Los Angeles field division San Bernardino County: California Div. Mines Rept. 27, p. 289-290.

Tucker, W. B. and Sampson, R. J., 1932, Los Angeles field division Economic mineral deposits of the San Jacinto quadrangle: California Div. Mines Rept. 28, p. 3-11.

Tucker, W. B. and Sampson, R. J., 1934, Current mining activity in southern California Riverside County; San Bernardino County: California Div. Mines Rept. 30, p. 320-326.

Tucker, W. B. and Sampson R. J., 1940, Los Angeles field district Current mining activities in southern California: California Div. Mines Rept. 36, p. 47-53.

Tucker, W. B. and Sampson, R. J., 1941, Recent developments in the tungsten resources of California, Riverside County: California Div. Mines Rept. 37, p. 582-584.

Tucker, W. B., and Sampson, R. J., 1943, Los Angeles field district: California Div. Mines Rept. 39, p. 65-66.

Tucker, W. B. and Sampson, R. J., 1945, Los Angeles field district Mineral resources of Riverside County: California Div. Mines Rept. 41, p. 119-182.

Turner, Mort D., 1950, Aluminum: California Div. Mines Bull. 156, p. 286, 287.

Turner, Mort D., 1950, Clays: California Div. Mines Bull. 156, p. 28, 29, 144-145, 149.

Utley, Harry F., 1949, Minnesota Mining builds granules plant at site of historic California quarry: Pit and Quarry, Feb. 1949, 5 p.

Utley, Harry F., 1961, Riverside's new white cement plant: Pit and Quarry, July 1961, p. 127-130.

Vaughan, F. E., 1922, Geology of the San Bernardino Mountains north of San Geronio Pass: Univ. California Pubs., Dept. Geol. Sci. Bull., vol. 13, p. 319-411.

Vernon, James W., 1950, Iron: California Div. Mines Bull.
156, p. 315-318.

Ver Planck, William E., 1950, Salines: in California
Div. Mines Bull. 156, p. 31, 223, 224, 227, 242.

Ver Planck, William E., 1951, Gypsum resources of Calif-
ornia: in California Div. Mines Bull. 155, p. 117-
121.

Ver Planck, William E., 1952, Gypsum in California:
California Div. Mines Bull. 163, p. 9, 24, 57, 97.

Ver Planck, William E., 1954, Salines in southern California;
in California Div. Mines Bull. 170, chap. VIII,
p. 6-7, 11-12.

Ver Planck, William E., 1957, Gypsum: in California Div.
Mines Bull. 176, p. 231-240.

Ver Planck, William E., 1958, Salt in California: Calif-
ornia Div. Mines Bull. 175, p. 7, 15, 16, 17, 28, 34-35,
74-75, 115, 123.

Walker, George W. and others, 1956, Radioactive deposits
in California: California Div. Mines Special Rept.
49, 38 p.

Ware, Glen Chase, Jr., 1958, The geology of a portion of
the Mecca Hills, Riverside County, California:
unpub. Master's thesis deposited in the geology
library, Univ. California Los Angeles.

Waring, Gerald A., 1915, Springs of California: U.S.
Geol. Survey Water-Supply Paper 338, 410 p.

Waring, Gerald A., 1919, Ground water in the San Jacinto
and Temecula Basins, California: U.S. Geological
Survey Water-Supply Paper 429, 113 p.

Webb, R. W., 1938, Evidence of age of a crystalline
limestone in southern California: Jour of Geol.
vol. 47, p. 198-201.

Weber, F. Harold Jr., 1961, Mineral Rights: Mineral Inf.
Service, vol. 14, no. 2, p. 1-14.

- West, H. E., 1928, New attempt to develop Temescal tin deposit, in southern California: Eng. and Mining Jour. vol. 126, pt. 4, July 28, p. 131-132.
- Wightman, R. H., 1945, New caving procedures at the Crestmore limestone mine: Trans. AIME, vol. 163, p. 215-224.
- Wightman, R. H., 1956, New underground mining at Crestmore: Mining Congress Jour., Dec. 1956, p. 33-36, 78.
- Wightman, R. H. and others, 1957, Crestmore makes a change: Mining Engineering, April 1957, p. 450-454.
- Williams, James J., 1956, Geology of part of the Orocopa Mountains, Riverside County, California: unpub. Master's thesis deposited in the geology library, Univ. California Los Angeles.
- Withington, C. F., 1962, Gypsum and anhydrite in the United States: U.S. Geol. Survey Mineral Inv. Res. Map MR-33.

Woodford, A. O., and others, 1941, Section across Commercial Quarry, Crestmore, California: Am. Mineralogist, vol. 26, p. 351-381.

Woodford, A. O., 1943, Crestmore Minerals: California Div. Mines Rept. 39, p. 333-365.

Woodford, A. O., and others, 1954, Geology of the Los Angeles Basin: California Div. Mines Bull. 170, chap. II, contr. 5, p. 65-81, pl. 1.

Woodring, W. P., 1931, Distribution and age of the Tertiary deposits of the Colorado Desert: Carnegie Inst., Washington, Publ. 148, p. 1-25.

Woodring, W. P., and Popenoe, W. P., 1942, Upper Cretaceous formations and faunas of southern California: Am. Assoc. Petroleum Geologists Bull., vol. 26, no. 2, p. 166-176.

Woodring, W. P., and Popenoe, W. P., 1945, Paleocene and Eocene stratigraphy of northwestern Santa Ana Mountains, Orange County, California: U.S. Geol. Survey Oil and Gas Inv., Prelim. Chart 12.

Wright, Lauren A., 1950, Beryllium: California Div. Mines
Bull. 156, p. 132.

Wright, Lauren A., 1950, Feldspar: California Div. Mines
Bull. 156, p. 159, 160.

Wright, Lauren A., 1950, Gem Stones: California Div.
Mines Bull. 156, p. 164, 165.

Wright, Lauren A., 1950, Mica: California Div. Mines
Bull. 156, p. 186.

Wright, Lauren A., 1957, Beryllium: in California Div.
Mines Bull. 176, p. 75.

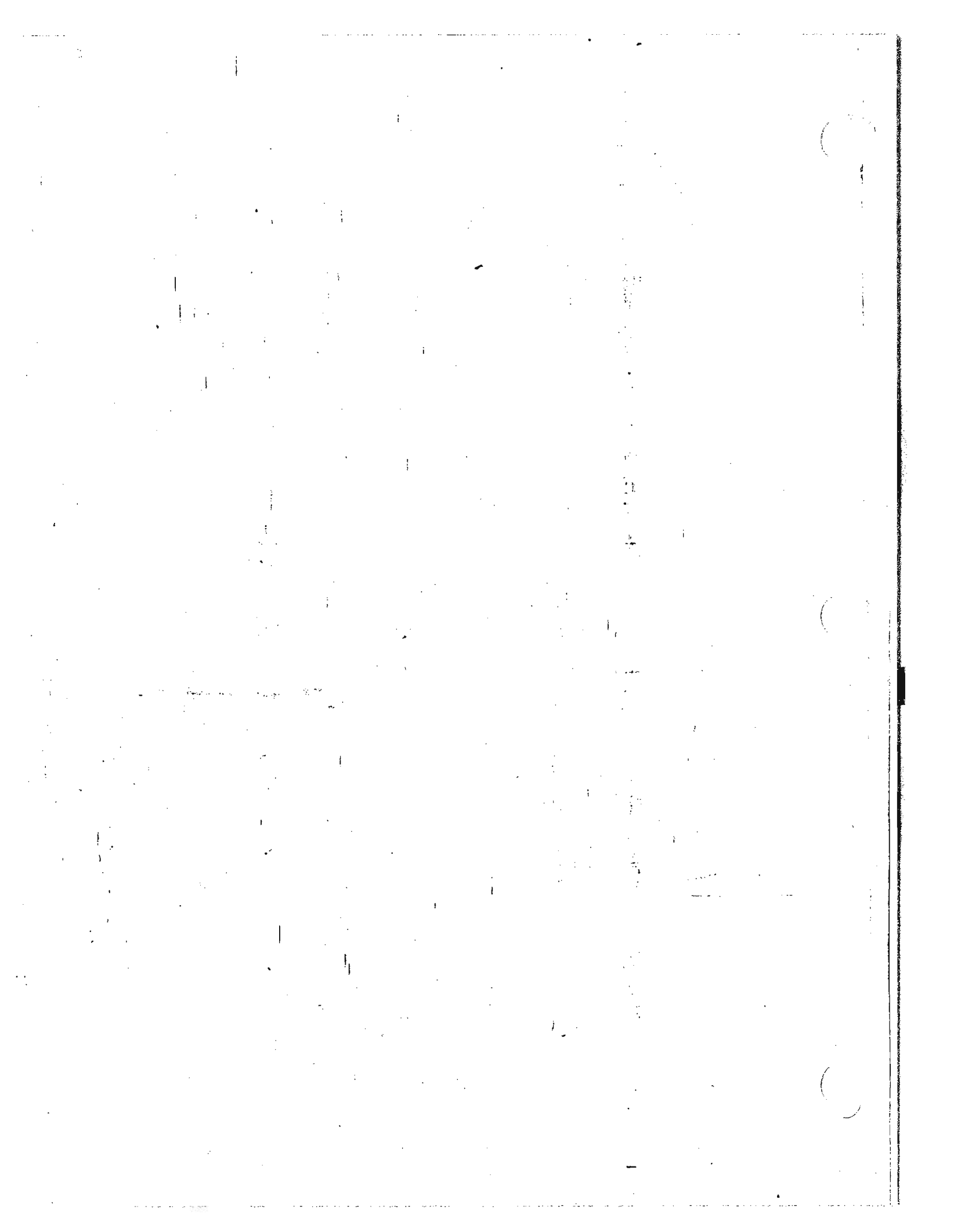
Wright, Lauren A., 1957, Feldspar: in California Div.
Mines Bull. 176, p. 196, 197.

Wright, Lauren A., 1957, Gem Stones: in California Div.
Mines Bull. 176, p. 205-214.

Wright, Lauren A., 1957, Mica: in California Div. Mines
Bull. 176, p. 359.

Wright, Lauren A. and others, 1953, Mines and mineral
deposits of San Bernardino County, California:
California Jour Mines and Geology, vol. 49, p. 73.

Bright, Lawrence B., 1946, Geology of Santa Rosa Mountain
area, Riverside County, California: California Div.
Mines Rept. 42, p. 9-13.



Mines and Deposits

Mines & Deposits

Tabulated List of Mines and Mineral Deposits

Riverside County, California*

Asbestos

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Dunn Asbestos deposit	Secs. 32 and 35, T6S, R5E, SBM, 4 mi. northwest of Nightingale Camp.	Elmer E. Dunn, Pinyon Flat (1945)	Amphibole asbestos in belt of serpentized rocks. Asbestos in narrow fractures and shears.	Worked through open cuts (Tucker 1945, p. 158, pl. 35).

*This tabulation contains data primarily on deposits not described in the text. Alternate or discarded names of described deposits are in this list. It is not a complete index of deposits. The symbol (t) means, see text for description.

Asbestos

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Perris Asbestos (deposit)	Sec. 2, T5S, R4W, SBM, 2 mi. south-west of Perris.	I. O. Walser, Los Angeles (1945).	Amphibole asbestos in veins 6 in. to 2 ft. wide in sheared granitic rock.	100 tons reported shipped to Soto Battery Box Manufacturing Co. in 1930. Worked through open cuts. Reported worked out in 1945 (Tucker 1945, p. 159, pl. 35).

Asbestos

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Serpentine Hill (claims)	Sec. 35, T6S, R5E, SBM, just east of Pinyon Flat.	Undetermined (1961)		(Tucker 1945, pl. 35).

Clay
Riverside County

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MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
5	Atlas Pit	S $\frac{1}{2}$ S $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 26, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash, at the western margin of the Gavilan Hills, $\frac{1}{2}$ mile north of Arcilla Siding.	International Pipe and Ceramics Corporation, 2901 Los Feliz Blvd Los Angeles 39	Much of the property is underlain by Triassic(?) Bedford Canyon Formation, but across the northern part is a band of residual clay-stone derived by weathering of Bedford Canyon Formation. In 1963 clays exposed in the pit included gray plastic, brown plastic, red mottled, and "bone" clays. Clay beds strike nearly east-west and dip 15° to 30° northerly.	15 acres. Apparently mined by the Atlas Fire Brick Company in the 1920's for use at their Los Angeles Plant. Later acquired by Gladding, McBean and Co. Inactive for many years since the 1920's but reactivated in 1960 and mined as part of the adjoining Corona Clay Pit of Riverside Cement Co. In 1963 the Atlas pit was about 150 feet long on several irregular bench levels with maximum face about 50 feet high. Part of the red mottled clay and all of the gray plastic clay goes to the Corona plant of International Pipe and Ceramics Corp. The remainder of the red mottled clay goes to the Crestmore plant of Riverside Cement Co., and the "bone" clay goes to their Oro Grande plant. After stripping mining is by Caterpillar D-8 equipped with ripper and bulldozer. Front end Caterpillar loader loads clay directly into truck and trailer units for transport to the plants. (Dietrich, 1928, plate 10 facing p. 162).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
7	Brown (J. W. Wilson)	N $\frac{1}{2}$ sec. 23 and 24, T1S, R23E, SBM, 3 miles south-southwest of Vidal along the Riverside-San Bernardino County line.	This is near or part of claim held by Mr. Brown, Vidal	The area is a badlands cut in Late Tertiary and/or Quaternary strata deposited in a lake, estuary, or bay. At least one bed contains pelycepod remains of undetermined systematic and ecologic affinities. Shark teeth have been reported from this locality. Impure, ^{in fossiliferous} bentonitic clay forms a unit as much as 20 feet thick.	The principal exposures lie in San Bernardino County where clay beds have been mined on a small scale. The material is ground at a small plant at Vidal and sold for use in well drilling. Samples from this deposit were once tested and found unsuitable for ceramic use. (Dietrich, 1928, p. 181-182, 340; Tucker, 1929, p. 502). See Niddleworth deposit (t) see Castillo, under coal (t) see Bedford Canyon clay deposit (t) See Big Ranch Clay Co. and Wadlow shale deposit See Keenan clay deposit (t)
	Brown Star claim				
	Castillo deposit				
	Corona clay deposit				
	Corona shale mine				
	Dutch placer				

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
16	Elsinore Joint Property	W $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 26, T5S, R5W, SBM. Low hills 2 miles southeast of Alberhill.	Pacific Clay Products, 1255 West Fourth Street, Los Angeles owns a half interest with International Pipe and Ceramics Corp., 2901 Los Feliz Blvd. Los Angeles 39.	Northern part of property covered by Quaternary terrace deposits. Southern part underlain by Paleocene Silverado Formation (upper part) green clay shale and micaceous arkose; beds strike northwest, dip 15°S.; southeastern part underlain by Silverado Formation (lower part) white, and red, white and buff mottled claystone, beds strike northwest, dip 6°S.	120 acres held in alternate 10 acre blocks by the two owners. Only the Hoist pit area (see herein in text), idle since 1912, has been mined. Both owners have done drilling and made bulldozer cuts on their respective parcels of land in recent years. In June 1963 the International Pipe and Ceramics Corp. drilled several test holes in their area just south of the old Hoist pit. One drill hole was as follows: Buff sandy overburden, 25 feet; red clay, 45 feet; buff and gray clay, 20 feet. Holes were drilled to 90 feet and the two observed were still in clay at 90 feet. (Dietrich, 1928, p. 181, plate 10 facing p. 162).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
17	El Sobrante	NE $\frac{1}{4}$ sec. 26, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash, at the western margin of the Gavilan Hills, $\frac{1}{2}$ mile north of Arcilla Siding.	Pacific Clay Products, 1255 West Fourth St. Los Angeles	Central part of property underlain by Triassic(?) Bedford Canyon Formation slate, argillite, and quartzite which strikes northwest and dips about 40° northeast. Along the east side of the property the Bedford Canyon Formation is overlain by nearly flatlying green clay shale and micaceous arkose of the upper part of the Paleocene Silverado Formation. Along the west margin of the Bedford Canyon Formation is a narrow band of residual claystone derived by weathering of the Bedford Canyon Formation. This band of claystone trends northeast and ranges in width from a featheredge to about 200 feet. The west portion of the property is underlain by nearly flat lying green clay shale and micaceous arkose of the upper part of the Silverado Formation, which overlies the band	Property consists of 160 acres. Held by Pacific Clay Products since before 1928. So far as known no development work has been done. (Dietrich, 1928, plate 10 facing p. 162, p. 181; Rogers, 1959, pl. 5).

of residual claystone.

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Evans Shafts	NE $\frac{1}{4}$ sec. 31, T5S, R4W, SBM, east side of State Highway 74, half a mile northeast of North Elsinore.	Undetermined	Surface covered by Quaternary alluvium. Clay not exposed.	Stauffer (1945, map Station 4) listed the area as "Evans shafts and incline to the fire clay." In 1963 only a small caved working was found in this location, but a shallow depression suggests the presence of caved underground workings. (Stauffer, 1946, map Sta. 4).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
22	Findley Prospect	SE 1/4 sec. 2, T5S, R6W, SBM. 9 miles southeast of Corona in low hills in Temescal Valley, 1 mile south of Arcilla Siding.	Undetermined	Area covered by Quaternary terrace deposits. Underlain by Triassic(?) Bedford Canyon Formation with upper surface weathered to form residual claystone. Thin (10 to 15 feet) discontinuous exposures of Paleocene Silverado Formation green clay shale and micaceous arkose. Small exposure of pink mottled clay.	Small prospect pit, date unknown. See Eagle Canyon clay deposit
	Fraser clay deposit				

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Freeman	Undetermined; probably various deposits between Main Street and Hagador Canyons about 3½ miles southwest of Corona	Undetermined	Clay-bearing Paleocene Silverado Formation sandstone and siltstone crop out in this area.	(Gray, 1961, p. 77-78, 111).

Clay
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
25	Harlow Pit	SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 15 (proj.), T4S, R6W, SBM. 5 miles southeast of Corona at the south side of lower Cajalco Canyon east of Temescal Wash.	Miss Lela May Harlow, Cajalco Road, Corona	Thin band of Paleocene Silverado Formation siltstone and clay shale strikes northwest and dips 45° NE. Silverado Formation crops out at base of a low hill and overlies residual claystone formed by weathering of Triassic(?) Bedford Canyon Formation. Hill is capped by Quaternary terrace deposits.	Pit opened by Liston Brick Company about 1954 as a source of material for their nearby brick plant. Both the Silverado Formation and residual claystone have been mined on a small scale up to the present (1963) as needed. Pit is a sloping side-hill cut about 150 feet long and 100 feet wide. Sequence exposed in main working in June 1963 was buff mottled claystone with red and gray pods, about 20 feet thick; overlain by red, sandy, clay soil about 5 feet thick. See Jones d ₁ 11 (1)

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Hoff Ganister Fire Brick Company	Undetermined			By 1928 some prospecting had been done by core-drilling and test-pitting. In 1929 property was reported to be 100 acres in sec. 22, T.5 S., R. 5 W., S.B.M. Apparently this property is now part of the holdings of International Pipe and Ceramics Corporation (Sloan pit area), or possibly is within the Alberhill Mines of Pacific Clay Products. (Dietrich, 1928, p. 174; Tucker and Sampson, 1929, p. 500; Sampson, 1935, p. 519).
	Hoffman deposit Leo Lorenzo				See Jones clay deposit (t) See Kroonen clay deposit (t)

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lord Deposit	Undetermined; may be same as Middlesworth clay or part of Corona placer described herein	Undetermined	Undetermined	George W. Lord, Corona reported light gray, fine-grained fire clay under development in 1905. (Aubury, 1906, p. 233; Gray, 1961, p. 71, 72, 78, 112).
	Visar pit				See Esosio place (2)
	Morton deposit				See Florence Clay Co. (2)

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
39	Murphy Pit	N $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 35, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash, at the western margin of the Gavilan Hills, $\frac{1}{4}$ mile west of Arcilla Siding.	Pacific Clay Products, 1255 West Fourth St., Los Angeles	Residual mottled claystone derived by weathering of Triassic(?) Bedford Canyon Formation and Jurassic (?) quartz latite porphyry occur in the western part of the property. Claystone is overlain by terrace deposits. Eastern part of property is underlain by Bedford Canyon Formation and quartz latite porphyry. According to Tucker and Sampson (1945, p. 162) red and yellowish-brown clay about 30 feet thick was overlain by 20 feet of overburden. In 1963 only residual pink mottled clay was observed with a terrace deposit overburden of at least 10 feet.	50 acre tract. Pacific Clay Manufacturing Co. owned and operated a large pit here in 1904 and the pit was still active in 1920, operated by the Pacific Sewer Pipe Co. By 1945 the Murphy pit was a side hill cut with a face 200 feet long and 50 feet high, operated by Pacific Clay Products. By 1963 an area about 1,250 feet long and 500 feet wide contained several irregular pits, the largest about 500 feet long, 200 feet wide, and 50 feet deep. Property has been idle since 1959. (Aubury, 1906, p. 223-224; Merrill, 1917 [1919], p. 569; Boalich and others, 1920, p. 89-90; Tucker and Sampson, 1945, p. 161-162; Stauffer, 1946, map Sta. 26).

clap
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
45	Park	E $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 26, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash at the western margin of the Gavilan Hills, $\frac{1}{2}$ mile north of Arcilla Siding.	Liston Brick Co. Lionel P. Liston, P.O. Box $\frac{7}{4}$, Corona	Northeastern part of the property is underlain by Triassic(?) Bedford Canyon Formation and Jurassic(?) quartz latite porphyry. Nearly flat lying green clay shale and micaceous arkose of the upper part of the Paleocene Silverado Formation crop out in the eastern and central part of the property. These sediments overlie residual claystone derived by weathering of Bedford Canyon Formation metamorphic rocks. The claystone crops out in the southwestern part of the property and ranges in width from 500 feet to 750 feet.	The Blue Face, Cross Cut, Grand View, and Oak Tree placer mining claims totaling 85.04 acres were patented to Thomas E. Parks and others in 1914. ^{Acquired by Liston Brick Co. about 1950.} Apparently the property has not been mined; but has been explored in recent years by drilling. (Aubury, 1906, p. 224; Dietrich, 1928, plate 10 facing p. 162; p. 180; Rogers, 1959, pl. 5). See Middleworth deposit (L)
	Red Bull				

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
49	Quintet	W $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 26, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash, at the western margin of the Gavilan Hills, $\frac{1}{4}$ mile north of Arcilla Siding.	Pacific Clay Products, 1255 West Fourth St. Los Angeles	Much of the property is underlain by Jurassic(?) quartz latite porphyry, but the central and southeastern portions are underlain at different points by residual clay derived from weathering of quartz latite porphyry and Bedford Canyon Formation metamorphic rocks. Exposures of the clays range in width from 75 feet to 500 feet. The residual clays are overlain by nearly flat lying green clay shale and micaceous arkose of the upper part of the Paleocene Silverado Formation.	Quintet placer mining claim of 88.79 acres was patented to Pacific Clay Products in 1926. The property has not been mined but has been extensively explored in recent years by means of drilling. (Dietrich, 1928, plate 10 facing p. 162, p. 180; Rogers, 1959, plate 5).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
52	Silt deposit (name undetermined)	E $\frac{1}{2}$ sec. 5, T5S, R3W, SBM. 1 $\frac{1}{2}$ miles southeast of Perris along the San Jacinto River.	Undetermined	Quaternary river silt and silty clay.	Colton Cement Plant is reported to have used clay at some period, before 1906 from the area of the San Jacinto River where traversed by the Santa Fe Railroad (Aubury, 1906, p. 224): No trace of former workings was found in 1963. See Wardlow shale mine

sky Ranch
lay mine, west
pit

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
5	South Pit	SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 35, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona in low hills in Temescal Valley, southwest side of Temescal Wash, 3/4 mile south of Arcilla Siding.	Pacific Clay Products 1255 West Fourth St. Los Angeles	Area covered by Quaternary terrace deposits. Underlain by Triassic(?) Bedford Canyon Formation with upper surface weathered to form residual claystone. Thin (10 to 15 feet) discontinuous exposures of Paleocene Silverado Formation green clay shale and micaceous arkose. In 1942 the pit exposed a high alumina clay horizon about 4 feet thick. The sequence exposed in the main part of the pit in 1963 was as follows: Bouldery, sandy overburden, 10-15 feet; red and gray mottled clay, 5 feet; white clayey sand, 2 feet; gray-white plastic clay, 1 $\frac{1}{2}$ feet; red and gray mottled clay, 1 $\frac{1}{2}$ feet; "bone" clay, 10 feet. The beds strike about N. 70° W., dip 10° SW., but in places appear to be nearly flat-lying. Overburden ranges from 10 to 30 feet.	28 acre tract. Pit probably opened after 1926. By 1942 it was being mined by Pacific Clay Products who have continued to mine intermittently until the present (1963). In 1945 the pit was a side-hill cut 250 feet long and 30 feet high; overburden was 10-15 feet, white siliceous fire clay 12-18 feet, red clay 15 feet. By 1963 the active pit was about 300 feet long, 200 feet wide, and 30 feet deep. Clay is mined by contract about once a year, stockpiled, and hauled to the Los Nietos plant as needed. Total production is unknown, but in recent years has been a few thousand tons each year. Clay reserves in the immediate pit area appear to be small. (Tucker and Sampson, 1945, p. 162; Stauffer, 1946, Map Sta. 24).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
58	Temescal Lease	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 35, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona in low hills in Temescal Valley, southwest side of Temescal Wash, $\frac{1}{2}$ mile southwest of Arcilla Siding.	Pacific Clay Products, 1255 West Fourth St., Los Angeles	Area covered by Quaternary terrace deposits. Underlain by Triassic(?) Bedford Canyon Formation with upper surface weathered to form residual claystone. Thin (10 to 15 feet) discontinuous exposures of Paleocene Silverado Formation green clay shale and micaceous arkose.	Triangular shaped 20 acre tract. ^{Proposed by} Not developed for clay, in use as a stockpile area in 1963.

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
59	Temescal Water Co.	NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 35, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona in low hills in Temescal Valley, southwest side of Temescal Wash, $\frac{1}{2}$ mile south of Arcilla Siding.	Temescal Water Co., 707 Main Street, Corona. Leased in part to Atlas Sewer Pipe Co., 10009 South Painter St., Whittier and in part to Mission Clay Products Co., 16961 East Santiago Blvd., Olive.	Area covered by Quaternary terrace deposits. Underlain by Triassic(?) Bedford Canyon Formation with upper surface weathered to form residual claystone. Thin (10 to 15 feet) discontinuous exposures of Paleocene Silverado Formation green clay shale and micaceous arkose. The pit active in 1942 exposed pink mottled clay and a high alumina clay horizon about 4 feet thick with overburden 10 to 30 feet. The 1963 pit sequence was: sandy conglomerate overburden, 10 feet; dark red clay, 15 feet; gray plastic clay, 3 feet; buff and red mottled clay, 3 feet. Beds strike about N. 55° W., dip 10° SW., but in places appear to be nearly flat-lying.	Pit in NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 35 opened in 1926 by open cut 25 feet wide and 40 feet long. In 1942 the pit was operated by Emsco Clay Co. and was about 300 feet long, 250 feet wide and 50 feet deep. This pit was inactive in January 1963, and apparently had been idle for some time. The active pit in 1963 is at the west side of Temescal Wash in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 35. It is a somewhat L-shaped side-hill cut about 300 feet long, 150 feet wide, and 30 feet deep. Mining for both lease holders is done by the Corona Clay Company utilizing bulldozers, rippers, power shovels, and front-end loaders. The several types of clay are stockpiled separately and transported as needed to the Atlas Sewer Pipe Company plant in Whittier and Mission Clay Products Company plant in Olive. The Corona Clay Company has mined this area for a number of years, probably since the late 1940's. Production of a few thousand tons each year, total undetermined.

(Dietrich, 1928, p. 181, 329; Stauffer, 1940

Map Sta. 25).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
60	Terra Cotta Eighty	W $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 26, T5S, R5W, SBM. Low hills 2 miles southeast of Alberhill.	Pacific Clay Products, 1255 West Fourth Street, Los Angeles	Most of the area is covered by Quaternary terrace deposits. Triassic(?) Bedford Canyon Forma- tion crops out along the western margin of the property and green clay shale and micaceous arkose of the Paleocene Silverado Forma- tion (upper part) crop out along the northern and eastern margins.	80 acres held by present owner since before 1926. May be site of the Dolbeer and Hoff Coal prospect, active in the 1880's (see in text under Coal). Area apparently has not been mined for clay. Drilling in the north part of property by Pacific Clay Products in the early 1960's is said to have penetrated com- mercial clays at depth. (Dietrich, 1928, p. 181, plate 10 facing p. 162).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
4/	Terra Cotta Plant Site	NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 26, T5S, R5W, SBM. Low hills 2 miles southeast of Alberhill.	Pacific Clay Products, 1255 West Fourth Street, Los Angeles	East half of property covered by Quaternary alluvium; Paleocene Silverado Formation (upper part) green clay shale and micaceous arkose crops out in west half. Property drilled in the early 1960's by Pacific Clay Products who reported clay encountered at minable depths.	40 acres held by present owner since about 1912. In 1905 the California Fire-Proof Construction Company was operating a plant at this site for the manufacture of sewer pipe, earthenware, and hollow bricks. Earlier the plant was owned by the Dolbeer Estate. By 1912 the plant was controlled by the Pacific Sewer Pipe Company, and is said to have been destroyed by fire that year. In 1905 the source of clay was the Alberhill pits, but earlier clay had been mined from 2 pits on the hillside at the factory. May be site of the Dolbeer and Hoff Coal prospect (see in text under Coal). By 1920 the plant had been dismantled. (Aubury, 1906, p. 222; Merrill, 1917 1919 7, p. 570; Boalich and others, 1920, p. 90; Dietrich, 1928, p. 181, plate 10 facing p. 162). P. J. Clay Co. Clay plant (?)

Tillaton Refractory Co.

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
55	Twin Springs (Temescal Sixty) prospect	NW $\frac{1}{4}$ NW $\frac{1}{4}$ and N $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 12, T5S, R6W, SBM. In Tem- escal Valley 4 miles northwest of Alberhill, on the west side of High- way 71.	Temescal Water Co., 707 Main Street, Corona	Gypsiferous clay shale and sand- stone (Paleocene Silverado Form- ation) crops out over an oval shaped area 200 feet wide and 500 feet long just west of the railroad cut. Shale strikes northeast, dips 40° NW. Clay was not exposed in January 1963, but the property is said to contain a bed of steeply dipping "bone" clay.	Pacific Clay Products held 60 acres under lease for many years. Prospect was explored many years ago, probably before 1928, by means of an adit, which was not located in 1963. Apparently the adit had disappeared before 1946. (Dietrich, 1928, p. 181, pl. 10 facing p. 162; Sutherland, 1935, p. 71; Stauffer, 1946, map station 23).

Clay

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
64	Tropico (Temescal) Tract	S $\frac{1}{2}$ SW $\frac{1}{4}$ and W $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 26, T4S, R6W, SBM. 8 $\frac{1}{2}$ miles southeast of Corona on the northeast side of Temescal Wash, at the western margin of the Gavilan Hills, $\frac{1}{4}$ mile north of Arcilla Siding.	International Pipe and Ceramics Corporation, 2901 Los Feliz Blvd, Los Angeles 39	Eastern part of the property is underlain by Triassic(?) Bedford Canyon Formation and Jurassic(?) quartz latite porphyry. The western part is underlain by residual clay derived by weathering of quartz latite porphyry and Bedford Canyon Formation. According to Dietrich (1928, p. 173) red, pink-mottled and blue plastic clays have been mined from this tract.	Property consists of 172.65 acres. Acquired by Gladding McBean and Co. in the mid 1920's from Tropico Potteries. By 1925 the principal pit was 800 feet long, 500 feet wide and had a maximum face height of 150 feet. There were also some underground workings of unknown extent. The pit was idle in 1925 and has been idle much of the time since. The property was last active in 1949 when some mining was done in open pits. By 1963 work on adjacent properties had obscured or destroyed much of the former Tropico Tract workings. (Dietrich, 1928, plate 10 facing p. 162; p. 173-174).

Clay Products Manufacturing Plants
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
21	Los Angeles Brick and Clay Products Company				See under clay section in text.

Clay Products Manufacturing Plants

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Hancock's Brick Yard	SE $\frac{1}{4}$ sec. 6, T2S, R4W, SBM. 3 $\frac{1}{2}$ miles northeast of Riverside.	Hancock Brick Co. 21516 Main Street Highgrove.	Red clay soil was mined for many years from pit 10 to 20 feet deep.	Plant for the manufacture of common red brick; located in San Bernardino County. Incorrectly listed as a Riverside County location in previous reports. Probably so located because prior to about 1915 the plant and shallow pits were located in the SE $\frac{1}{4}$ sec. 14, T. 2 S., R. 5 W., S.B.M., on the bluff just southeast of Fairmont Park in Riverside, in the area later occupied by the Southern Sierras Power Co.

Clay Products Manufacturing Plants
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
38	Mount (Mission) Clay Products	SE $\frac{1}{4}$ sec. 34, T4S, R6W, SBM. 9 miles southeast of Corona in low hills in Temescal Valley, $\frac{1}{4}$ mile west of State Highway 71.	Mission Clay Products Company 16961 East Santiago Blvd. Olive	Area covered by Quaternary terrace deposits.	Late in 1958 a small plant utilizing a beehive kiln was erected by William J. Mount for the manufacture of vitrified sewer tile and drain pipe and common red brick. Raw materials used included soil from the plant area and clay purchased from the Corona Clay Co. Plant was idle in January, 1963 and by June 1963 had been acquired by Mission Clay Products.

Clay Products Manufacturing Plants
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Mission Clay Products				See: Mount Clay Products.

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
75	Aztec	Reported to be in Sec. 30 (proj.), T. 4 S, R. 20 E., S30M, high on the west slope of the McCoy Mountains. Accessible only by trail.	Undetermined	Probably similar to the Eagle Nest (herein)	(James F. George, 316 S. Spring, Dlythe, personal communication).
	Badger State				See Eagle Nest mine (7)

Clay Products Manufacturing Plants
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Prado Tile Company	Vicinity of Prado Dam Spillway, 4 miles west of Corona.			For many years at a plant at the settlement of Prado, West of Corona, hand-made roofing tile and Mexican pottery were manufactured from clays supplied from the Corona area. The plant (or plants?) which was operated at different times by the Prado Tile Co., La Olla Tile Co., and the Casa Blanco Tile Co., was closed about 1940 when the Prado flood control project acquired the former site of Prado. (Dietrich, 1928, p. 180; Gray, 1961, p. 63).
	Albarrill Coal and Clay mine Hoy Ranch deposit Hoffmann's prospect Jones deposit Kronen group				<i>Coal</i> See Albarrill Coal and Clay (t) See Jones clay deposit (t) See Jones clay deposit (t) See Jones clay deposit (t) See Kronen clay deposit (t)

Copper

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
76	Big Basin (Hines) Copper Prospect	NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 3, T4S, R6W, SBM. In a highland valley one mile northwest of Cajalco Hill and the Cajalco tin mine.	Lake Mathews Farm- ing Co. Route 2, Box 98 Corona	Jurassic, Temescal Wash Quartz Latite Porphyry cut by shear zone which strikes N.45°E., dips 45°NW. Sever- al small black tourmaline dikes which strike nearly north also crop out in the area. Across about 80 feet of highly altered rock in the shear zone are 4 parallel "veins" or mineralized shears ranging from a few inches to 6 feet in width. Mineralization consists of reddish- brown to black iron oxide, mala- chite and chrysocolla coatings and a few spots of azurite.	Area was prospected for copper carbonate before 1915. In 1946 the area was pros- pected by bulldozer trenching over an area some 500 feet by 50 feet, with a few isolated trenches about 1,000 feet south- west of the main trenches. Soil over- burden ranged from 2 to 6 feet and trench- es penetrated as much as 10 feet of copper-bearing quartz latite. A vertical shaft had been sunk to a depth of 20 feet in 1946, and an old 35 foot shaft had been filled by the trenching. About a carload of "shipping ore" was stockpiled on the property in Oct. 1946 from which a random type sample was selected. This sample was assayed by Abbot A. Hanks Inc., San Francisco and showed 0.025 oz. gold and 16.57 oz. silver per ton and 2.69% copper. In January 1963 no evidence of former prospecting was found, the shaft was in use as a waste water sump and the area had been planted to avocado and citrus trees. (Div. Mines Field Report

No. 131; Waring, 1919, p. 15).

Claim Book filed, no. 53

Copper

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
77	Collins Prospect	NE $\frac{1}{4}$ sec. 4 (proj.), T4S, R6W, S8M. Half a mile east of Temescal Canyon, about 500 feet above the canyon floor.	Wesley R. Collins 19951 Gavilan Road Riverside	Jurassic(?) Temescal Wash Quartz Latite Porphyry. Steeply-dipping shear zone trends northwest, exposed in open cut 200 feet north-west of shaft. Sample from small stockpile near the shaft was much altered; mineralization consisted of black tourmaline, reddish-brown to black iron oxide and sparse thin coatings of malachite and chrysocolla.	Area prospected in 1956 and 2 carloads of copper ore shipped to A.S. & R. at Midvale, Utah. Smelter assay is said to have shown 0.8% Cu. In 1962 a vertical 2-compartment shaft was sunk. In January 1963 it was filled with water to within 25 feet of the surface. Size of dump suggests shaft may be about 100 feet deep. Several bulldozer cuts have been made along the shear zone both east and west of the shaft. Inactive in January, 1963, but head frame and hoist house remained on the property. Intermittent prospecting apparently is being done.

Crescent

See Eagle Nest mine (6)

Riverside County

3.2

Copper

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Mountain King (claim)	Sec. 23, T4S, R20E, SBM.	Undetermined		(Tucker 1945, pl. 35).

Copper

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palen Copper mines	Sec. 22, T5S, R18E, SBM, on west side of Palen Mts.	Undetermined	Reported as a vein 50 ft. wide in quartzite and porphyry and a ledge in sandstone, quartzite and granite.	Explored through shallow shafts, cuts and prospects. Reported to have ore containing as much as 30 percent copper. (Aubury 1908, p. 341; Tucker 1945, pl. 35; Eric 1945, p. 294).

Copper

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Silver Joe	Sec. 18 or 19, T4S, R19E, SBM, on the east slope of the Palen Mts. about 1 mile southwest of the Homestake (see herein under copper)	Floyd Vernoy and B. H. Craig, 938 Maple, Beaumont (1962)	A northwest-trending shear zone contains sporadic quartz lenses ranging from 0 to 6 inches wide. Vein material comprises fractured, euhedral quartz crystals, as large as one-half inch in diameter and 2 inches long, cemented with chalcocite and secondary carbonates. Shear zone traceable about 300 feet (Personal communication, Tomo Ito, 1963).	Developed through an 8-foot shaft and shallow prospects.

Feldspar-silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>W. S. F. & Co.</i> Brown deposit <i>Blom mine</i>	Reported to be in SE $\frac{1}{4}$ sec. 28, T4S, R2W, SBM, about 3 $\frac{1}{2}$ mi. east of Nuevo.	Undetermined	Diorite cut by dike comprising massive quartz and segregations of feldspar, about 100 ft. wide and exposed for 1,500 ft.	<i>See map of L. S. F. & Co.</i> Explored by open cuts of undetermined extent. Mined on a small scale in 1920's (Sampson 1931, p. 421-422; 1935, p. 521; Tucker 1945, pl. 35). <i>St. Pierre Mine</i>

Feldspar-silica
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Dunn (claim)	Sec. 2, T7S, R5E, SBM.	Undetermined		(Tucker 1945, pl. 35).

Feldspar-silica
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ensley-Spaulding (deposit)	T6S, R2W(7), SBM, 7 mi. southwest of Hemet.	Undetermined	Reported to be several small lenses (probably pegmatite) in granite. Feldspar one ft. thick pinching out at shallow depth.	Four cars (presumably feldspar) shipped by 1929 (Tucker 1929, p. 504).

Feldspar-silica
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	La Borde (deposit)	Reported to be in sec. 28, T4S, R2W, SBM, about 3 mi. east of Nuevo.	Undetermined	Feldspar occurs as irregular lenses and masses in pegmatite dike of unreported extent in diorite.	About 2,000 tons of feldspar reported shipped by 1931 (Tucker 1929, p. 505; Sampson 1931, p. 422; 1935, p. 521; Tucker 1945, pl. 35).

Feldspar-silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Machado (deposit)	SE $\frac{1}{4}$ sec. 9, T5S, R2W, SBM, about one mile west of Homeland on the south margin of the Lakeview Mts.	Undetermined	Feldspar-quartz pegmatite dikes as much as 30 ft. wide strike N.40°E., dip at low angles northwest, country rock diorite.	Explored by open cuts and trenches of undetermined extent. Reported to have yielded 60 cars feldspar prior to 1931. (Tucker 1929, p. 505-506; Sampson 1931, p. 423-424; 1935, p. 521; Tucker 1945, pl. 35).

Feldspar-silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Morgan Ranch (deposit) Nuevo	Reported to be in sec. 28, T4S, R2W, SBM, about 3 mi. east of Nuevo.	Undetermined	Feldspar and quartz in parallel, northwest-trending dikes of unspecified dimensions.	(Sampson 1931, p. 424; 1935, p. 521; Tucker 1945, pl. 35). see South in Pacific deposit

Feldspar-silica
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Patterson (deposit)	Reported to be in sec. 29, T4S, R2W, SBM, about 2 mi. east of Nuevo.	Undetermined	Parallel, feldspar-quartz-rich pegmatite dikes strike N.40°W., dip 60° NW., are 20 to 30 ft. wide and exposed for 200 ft.	Reported developed through 50-ft. adit to bottom of glory hole. (Sampson 1931, p. 424; 1935, p. 521; Tucker 1945, pl. 35).

Feldspar-silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Riverside Cement	E½ sec. 29, T4S, R2W, SBM, probably on west slope of ridge in NE¼ of section.	Undetermined	Feldspar-rich pegmatite dikes of unreported thickness and extent.	This deposit was worked by Riverside Portland Cement Co., prior to 1929, for feldspar to be used in their plant near Riverside. (Tucker, 1929, p. 506; 1945, pl. 35; Sampson 1931, p. 425).

Feldspar-Silica

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	San Jacinto Rock Products Co.	Sec. 7, T5S, R1W, SBM, on southwest slope of Polly Butte, 3 miles south of Hemet.	Undetermined	Undetermined	Probably Hemet Silica deposit (see herein).

~~Rock Products~~
Feldspar and Silica
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
98	Spicer Silica	SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 29(?), T2S, R4W, SBM. Low hill just west of U.S. Highway 60 and 395. May be in SW $\frac{1}{4}$ sec. 21 low on west margin of Box Springs Mtns., $\frac{1}{4}$ mi. east of Santa Fe RR.	Undetermined	According to Tucker and Sampson (1929, p. 506-507), two small lenses of quartz occur in granite and strike N. 65° W., dip 55° SW. The quartz lenses were reported to have a maximum thickness of 3 ft., were about 10 ft. apart, and had been exposed for about 12 feet along the dip. In sec. 21 narrow beryl and columbite bearing pegmatite dikes occur in quartz diorite.	In sec. 29 is a side-hill semicircular cut about 150 ft. long, 75 feet wide and 15 feet deep. This cut may be the Spicer silica described by Tucker and Sampson (1929, p. 506-507), but in 1963 the faces were slumped and the quartz lenses were not observed. Several thin pegmatite dikes, as much as 8 inches thick, occur in blue-gray quartz diorite (Cretaceous Bonsall Tonalite). In sec. 21 several workings, the largest of which is a trench 40 ft. long, expose pegmatite dikes. This location more closely matches the early descriptions of Tucker and Sampson. No production, idle in 1929 and apparently has since remained idle. (Tucker and Sampson, 1929, p. 506-507; Sampson and Tucker, 1931, p. 444; Tucker and Sampson, 1945, pl. 35).

~~Rock Products~~

Feldspar and Silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
99	Stone and Alexander Quarry	NE $\frac{1}{4}$ sec. 19, T2S, R5W, SBM. About 4 miles west of Riverside on the southeast slope of the Pedley Hills, a quarter of a mile northwest of Limonite Ave.	C. P. Stone, 845 So. Hill St., Los Angeles (1929). Undetermined (1963)	Pegmatite dikes in Cretaceous Bon-sall Tonalite. Five dikes about 40 feet apart strike N. 45° W., are vertical to steeply northeast dipping, and are about 1,500 feet long. Dikes range in width from 6 feet or less to 25 feet and are composed of quartz and orthoclase feldspar <u>very</u> with little biotite.	Open cuts and trenches. In 1929 an open cut at the foot of the hill was 15 feet deep and 30 feet long with an adit driven 25 feet into the hill. This open cut explored a northwest-trending vertical pegmatite dike 25 feet wide. In 1963 these workings were mostly filled, but a face about 10 feet high and 25 feet long cut in a quartz-orthoclase feldspar dike remained. About 1,000 feet northwest of this cut and on top of the hill is a trench some 80 feet long with an average depth of 10 feet. This trench explores a quartz-orthoclase feldspar dike six feet wide. The quarry was idle in 1929 and apparently has since remained idle. In 1963 residential development surrounded the lower filled workings and residences covered the hills below the upper trench. (Tucker and Sampson, 1929, p. 507; Sampson and Tucker, 1931, p. 425).

Feldspar-silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Warren (deposit)	Reported to be in E $\frac{1}{2}$ sec. 21, T4S, R2W, SBM, about 4 $\frac{1}{2}$ mi. east of Nuevo.	Undetermined	Parallel quartz-feldspar-rich dikes of unreported extent.	Developed through open cut 70 ft. deep by 25 ft. wide and 50 ft. long and an underlying adit which connects with the open cut by two 25-ft. raises. Also other short adits and shallow cuts. (Tucker 1929, p. 507; 1945, pl.35).

N.C.

Feldspar-silica

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Weir Feldspar (deposit)	Reported to be in NE $\frac{1}{4}$ sec. 29, T4S, R2W, SBM, about 2 $\frac{1}{2}$ mi. east of Nuevo.	Reported to be patented; held in 1931 by A. C. Weir, Los Angeles	Narrow pegmatite dikes in granitic rock.	Prospected by series of open cuts. (Sampson 1931, p. 426; Tucker 1945, pl. 35). S. Cochill - Bear (L) San White Prince (L)
	Williamson mi				
	Yellow Queen				

Garnet

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Sunny Day (mine)	Near Indio	John I. Fassett, 271 W. 4th Street, San Pedro (1937)		(Bardley-Wilmot, 1937, p. 23; Troxel, 1957, p. 24).
	April Fool California Gems Columbia Gems Beryl Crystal Klugee Silica Beryl Summons -				Gems See Belo Horizontals claim (1) See Schneider claims (1) See Anita mine (1) See Schneider claims (1) See Mono mine (1)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Alice (mine)	T6 and 7S, R14 and 15E (?), SBM.		Abundance of chrysocolla noted by Orcutt.	No other record or field evidence of a mine of this name in the Chuckwalla Mtns. Ore type suggests mislocation from Riverside Mtns. (See Alice herein). (Orcutt, 1890, p. 901; Merrill, 1919, p. 539).

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Allen Placers American Flag	Sec. 12, T4S, R20E, SBM, in the Little Maria Mts.	U.S. Gypsum Co.	An area, partially covered by gravel, underlain by complexly folded and faulted gypsum, lime-stone, lime-silicate rocks and schist (see discussion under Marie Mountains deposits in gypsum section).	Patented in 1934, the Allen, Riverside and Victor were called the Allen Group Placers. See Hidden Treasures 1-11-12

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Annie Laurie	Sec. 7, T5S, R11E; Secs. 3, 4, T4S, R13E, SBM.	Undetermined	Undetermined	A patented claim and millsite surveyed for Iron Chief Mining Co. in 1910 and tied to U.S. Mineral Monument no. 139 (Saul. 1962, p. 7).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Annie Rooney mine	T2S, R12E, SBM.	Undetermined (1961		(Merrill, 1917, p. 538).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ardanelle (claim)	T6S, R16E, SBM, 3 miles SE. Corn Springs.	Undetermined	Vein on felsite-porphyry contact.	Open cut and drift (Tucker, 1929, p. 472).

Riverside County

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Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Arroyo del Toro (prospects)	Secs. 6, 7 (?), T5S, R4W, SBM.	Undetermined (1959)	Granodiorite, slate and quartz latite porphyry.	Prospects. (Jensen, 1948, p. 130; 1951, p. 47; Engel, 1959, p. 113).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bankers (group) Brimonk	Sec. 27, T6S, R15E, SBM, 4 miles west of Corn Springs	Undetermined (1961)		(Merrill, 1919, p. 540; Tucker, 1929, p. 473; 1945, p. 128, pl. 35). Crescent (?)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Binkley's diggings	Sec. 2, T6S, R4W, SBM, near the junction of Cottonwood Canyon and San Jacinto River about 3 miles east of Elsinore.	Undetermined		Active in 1876, extent or success undetermined (Merrill, 1919, p. 527; Engel, 1959, p. 113).

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Black Diamond</i>	<i>Sec. 2 T5S, R12E</i>	<i>Undetermined</i>	<i>Undetermined</i>	<i>Tied to U.S. Mineral Monument No. 140. (Saul 1962, p. 7).</i>
	<i>Black Jack claims</i>				<i>Do Film. (S).</i>

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Black Eagle placer	Sec. 24, T8S, R5E, on or near Buck Ridge.	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Black Warrior	Sec. 5, T5S, R23E, SBM.	Undetermined		Could be an older name for the Lindy Loop #1 deposit (see herein under iron) (Tucker, 1945, pl. 35).

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Black Warrior (See Blue Bell in this list) Blackbird				See Table 1 (L), under tungsten, 11

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Blue Bell	Sec. 6, T2S, R24E	Undetermined	This property is in an area underlain by complexly folded and sheared carbonate and schistose rocks.	Two claims, the Black Warrior and Blue Bell, were patented by Vidal Mining Co. in 1922. At that time these claims were called the Blue Bell group. (Tucker 1945, pl. 35).
	Blue Bell				See Golden Bell (!)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Blue Goose	Sec. 23, T7S, R6W, SBM (proj.), near north rim of Verdugo Canyon, $\frac{1}{2}$ mile south of Wheeler Ranch.	George W. Williams, Box 462, San Juan Capistrano, and Charles Christopher-son, Box 205, San Juan Capistrano (1954)	Brecciated zone near contact of andesite and dacite porphyry replaced and filled by quartz, sericite, and limonite derived from oxidation of pyrite.	Undeveloped (1959) (Engel, 1959, p. 114).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bob Cat No. 1				See Purple Hope.

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bonanza	NW $\frac{1}{4}$ (?) sec. 29, T2S, R3E, SBM, in Cottonwood Canyon about 1 mile southeast of Cox Ranch and 5 miles northwest of Whitewater.	James Varia, 39067 Orchard St. Rt. 1, Cherry Valley; Chas. Armijo, 5313 Ave. L-10 Quartz Hill; James Kaiser, 1648 N. Florida Banning; Joseph Desmarias, 4315 Mountain Ave., San Bernardino.	A vein of unreported width and extent in a faulted and sheared complex of igneous and metamorphic rocks within the San Andreas fault zone.	Appears to be a relocation of an old, undescribed property. Developed through a 119-foot adit. No road to property (1963).

Gold

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bonanza Crater group	Sec. 1, T4S, R10E, SBM (proj.).	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bonanza Lode	NE $\frac{1}{4}$ sec. 26(?), T3S, R8E, SBM, 1 mile southwest of Pinyon Well, north slope of Little San Bernardino Mtns.	Undetermined (1960)	Quartz veins cutting coarse-grained quartz monzonite.	Location is from patent plate and Tucker and Sampson (1945, pl. 35, no. 24), but no mine was found here. May be an erroneous location; property could be in NW $\frac{1}{4}$ sec. 26. In NW $\frac{1}{4}$ sec. 26 quartz monzonite cut by quartz veins striking northwest and dipping steeply southwest. Here, veins explored by pits and shafts (See Hansen mine herein).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Boulder (claim)	T6S, R15E, SBM, one mile west of Granite mine.	Undetermined	Vein reported to strike north and dip nearly vertically.	By 1917 mine comprised three shafts 30, 50, and 100 feet deep, a 200-foot adit and open cuts. (Crawford, 1896, p. 310; Merrill, 1919, p. 540).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Brady prospect	NE $\frac{1}{4}$ sec. 4, T6S, R4W, SBM, southwest slope of hills about 1 $\frac{1}{2}$ miles east of Elsinore.	E. H. Brady, Elsinore (1937)	Contact of diorite and gabbro with schist where vein quartz accompanies a 4 to 6 foot wide aplitic dike, now much fractured and decomposed, that strikes N. 50° W. and is vertical.	Dike zone explored by 35-foot vertical shaft with lateral workings of undetermined extent, and two other shafts, one 15 feet deep with a 25-foot connecting adit and one 35 feet deep. (Engel, 1959, p. 114).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>111012</i>				<i>111012 (1)</i>
	C & C Consolidated (mine)	4 miles west of Perris	Undetermined	Narrow vein in granitic rock.	Developed through a 150-foot adit and a shaft. (Crawford, 1896, p. 310; Merrill, 1919, p. 532).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Champion (mine)	T6 or 7S (?), R14 or 15E (?)	Undetermined		Argentiferous lead ore, wulfenite noted by Orcutt. (Orcutt, 1890, p. 901).
	Chuckwalla				See Bryan (t)
	Chuckwalla and Redal Gr.				See Bryan (t).

Gold
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Coffee (mine)	T6S, R15E, SBM, 4 miles west of Corn Springs.	Undetermined	Northwest trending vein as much as 18 inches wide.	Shaft 56 feet deep reported in 1917. (Crawford, 1896, p. 310; Merrill, 1919, p. 540; Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Colorado (mine)				See Justice.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Colorado (claim)	Sec. 36, T1S, R23E, SBM.	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Columbus (mine)	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538).

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Corn Springs Placer claim	Sec. 28 (proj.), T6S, R16E, SBM, at Corn Springs 7½ miles southeast of Desert Center.	Undetermined	Alluvial deposit at east (drainage outlet) end of a narrow valley.	One patented claim. No record of production; probably small. (Saul, 1962, p. 4,7).
	Desert Gold Group				See Neck mine and Thelma Group (C)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Double Eagle (mine)	T8S, R20E, (?), SBM, probably on east slope of Mule Mountains.	Undetermined		(Merrill, 1919, p. 541).-

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Echo Valley	Secs. 1, 2, T7S, R14E, SBM, on the southwest margin of the Chuckwalla Mts., about 1 mile southeast of the Model mine.	J. H. Barry, 8242 Garibaldi Ave., San Gabriel; Myron Smith, Box 8, Box Canyon Rd., Canoga Park		Once part of Chuckawalla and Model Group (see herein under Model). Purchased by these owners in 1941 (personal communication, J. H. Barry, 3/22/63).
	<i>Edith</i>				<i>See Monarch Group (c)</i>
	<i>El Dorado</i>				<i>See New El Dorado (L)</i>
	<i>Enseparation</i>				<i>See Hidden (t)</i>

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ethel (mine)	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Fish (mine)	T7S, R12E (?), SBM, 6 miles northeast Dos Palmas and 12 miles northeast of Salton.	Undetermined	Reported to be a quartz vein.	Adit on vein. May be an old name for Dos Palmas (see herein). (Crawford, 1894, p. 221; 1896, p. 311; Merrill, 1919, p. 541; Tucker 1929, p. 477; 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Free Coinage and Charity mine	T6 S, R13E, SBM.	Undetermined.	Quartz vein with some argentiferous galens and lead carbonate.	This might have been a different name for the Sterling mine (see herein). (Crawford, 1894, p. 221; 1896, p. 311; Merrill 1919, p. 541; Tucker, 1945, pl. 35)
	Goat, Goat Basin	}			See Bear mine (t)
	Gold Coin				See Gold Eagle (t)
	Gold Crown #1				See Rich Gold (t)
	Gold Flake				See Silver claim (t)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Gold Hill (mine) Gold Master	Sec. 3, T4S, R10E, SBM (proj.).	Undetermined		(Tucker, 1929, p. 479; 1945, pl. 35). See Black Warrior (L)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Gold Prince				North extension of Good Hope, which see. (Merrill, 1919, p. 532).
	Gold Rose				See Brecklyn (t)
	Gold Tiger				See Black Butte (t)
	Golden Christ				See Golden Charloff (t)

GO

RIVERSIDE COUNTY

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Golden Crown	Sec. 297 T6S, R1E, S8M, about 2 miles east of Kenworthy Guard Station	Dexter C. Wayne, 25889 Columbia St., Hemet	Narrow veins reported to be of good grade; presumably in a fault or shear zone in diorite. as are most of the mines in the area.	One inaccessible, 100-foot shaft. Prospecting and trenching during 1962-63 have exposed (vein system through about 500 feet claim purchased by this owner early in 1962. (Written communication, Dexter C. Wayne, May, 1963.)
					1 26

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Golden Key	Sec. 7, T6S, R16E.	Undetermined	Undetermined	Developed by 55-foot shaft, 20-foot tunnel, 45 feet of drifts, and a 5-foot by 20-foot open cut. Gold-silver ore produced 1934 to 1937, also contained 1.77% lead and recoverable copper. (Eric, 1948, p. 292; Goodwin, 1957, p. 602).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Golden Rule (group)	Reported to be in sec. 30, T2S, R10E, SBM, south of Twentynine Palms in the Pinto Mountains.	Undetermined	Vein striking N.30°W. and dipping 80°W. occurs in gneissoid granite. Range s in width from 1 to 2 feet. Diorite dike on footwall.	75-foot shaft on vein with drift 35 feet south at 50-foot level. Mine active in 1929 (Tucker and Sampson, 1929, p. 480).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Golton (group) (Mineral Chief)	NW $\frac{1}{4}$ sec. 20, T5S, R4W, SBM, about 2 $\frac{1}{2}$ miles north-north-east of North Elsinore.	D. V. French and J. S. Hopper (1946)	Two vuggy quartz veins 1 $\frac{1}{2}$ and 3 feet wide about 250 yards apart in northerly trending, steeply dipping zones, 3 to 5 feet wide, of shattered porous, iron and manganese-stained siliceous rocks in quartz latite porphyry.	West vein explored by 10-foot open cut and 15-foot inclined shaft; east vein by 65-foot adit. (Tucker, 1929, p. 480; 1945, pl. 35; Engel, 1959, p. 115).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Good Hope (group)	Sec. 25, T2S, R3E, SBM, about 1 mile east of Whitewater Wash.	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Gray	Sec. 24, T4S, R18E (proj.), SBM, in the central Palen Mts. about 2 miles southwest of the Homestake (herein under copper).	Undetermined	Undetermined	Patent was applied for on a single claim but no record was found that it was granted (U.S.B.L.M. records, 1932).
	<u>Gray</u>				See Lum Gray (?)

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Gray Eagle (see Waterloo in this list)				

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Great Eastern <i>Great Western</i>	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538). <i>See R-1 Claim Log (L)</i>

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Hager-Kale (mine)	Reported to be in sec. 2, T3S, R5E, SBM.	Undetermined	Vein quartz (probably in gneiss of the Chuckwalla Complex).	(Proctor, 1958, p. 142).
	Hansen, Hansen well	}	-		See Hansen mine (1)
	Hexie				See Hexahedron (1)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Hidden Canyon claim,	Sec. 23, T6S, R9E, SBM.	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Hillerman (claim)	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538).
	Hillside Group				See Brown mine (t)
	Indian Queen				See Indian Rock Quarry

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ingersoll (Ramona) mine	Reported to be 50 miles northeast of Walters Station probably T2S, R12E, SBM.	Undetermined	A nearly vertical vein strikes north and ranges in thickness from 1 to 3 feet.	Two shafts, 40 and 80 feet deep (Crawford 1896, p. 311; Merrill, 1919, p. 538; Tucker, 1929, p. 482; 1945, pl. 35).
	Jackknife				S. Morning Star mine (C)
	Juanita #5				See Mountain Queen mine (C)

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Jumping Jack	Sec. 32(?), T6S, R16E, SBM, about 1½ miles southwest of Corn Spring	Undetermined	Undetermined	Surveyed for patent in 1913; survey no. 5066, tied to U.S. Mineral Monument no. 146. Survey plats marked "rejected". Property developed through a 190-foot drift adit driven S.22°W., three inclined shafts of moderate depth, one short winze, and a vertical shaft of unmarked depth (data from plat map).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Justice (Colorado) (mine)	Sec. 32, T4S, R4W, SBM.	Undetermined; a patented claim and millsite. Roger Clapp % Lawrence Butterfield 822 N. June Hollywood; a patented claim and millsite.	A narrow quartz vein of reportedly high grade in diorite.	The old workings are caved and appear long neglected. (Merrill, 1919, p. 531; Tucker, 1929, p. 483; 1945, pl. 35).

903

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Katherin No. 2 placer (claim)	Sec. 1 (proj.), T2S R12E, SBM, about 1/4 mile south of Gold Rose mine.	Ben Stauffer, P.O. Box 202, Johannesburg (1960)	Alluvium; probably fanglomerate.	Numerous shallow cuts, 25-foot adit and partly caved 40-foot adit to base of shallow shaft. (Oral communication, Michael R. Perkins).
	Keystone				See Tobb's claims (6) under Tongue-gill

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lake View prospect)	NW $\frac{1}{4}$ sec. 4, T6S, R4W, SBM, about 1 $\frac{1}{2}$ miles northeast of Elsinore.	Mack and Thurman (1937)	Deeply weathered and chloritized diorite includes shear zones containing alaskitic, aplitic, and pegmatitic dikes. Gold sought in shear zones which strike N. to NE., dip 35° to 60° SE.	Workings include pits 15 and 25 ft. deep, about 75 ft. apart in a SW.-NE. line, with a 12-ft. adit driven northward between them, exploring different shear zones. (Engel, 1959, p. 116).
	La Ploma				See Top of the World mine (c)
	La Rica				See Stone House mine (c)
	Laseter				See Lost Angel mine (c)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lee (prospect)	SE $\frac{1}{4}$ sec. 14, T6S, R5W, SBM, east base of Elsinore Mountains about 2 miles southeast of Willard.	Undetermined	Fault contact between slate and quartzite and diorite and gabbro.	Explored by 25-ft. crosscut adit filled with sand to within 2 ft. of back. Neither ore mineralization nor definite vein visible. (Engel, 1959, p. 116).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Liberty (group)	T7S, R15E, SBM, "in Red Cloud Canyon".	Undetermined	Quartz veins along a dike cutting gneiss. Average value reported to be about \$6 per ton.	Development consists of open cuts and one adit. Reported as part of "old Red Cloud Group". This could be the same property as the Tubbs claims (see herein). (Tucker, 1929, p. 483).
	Liberty Group				See Tubbs claims (1), and Tongue.
	Little Naggi				See Maggie mine (1)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Little Pete (claim)	Sec. 31(?), T4S, R4W, SBM, 4 miles west of Perris.	Undetermined	Narrow, west trending vein containing arsenical pyrite.	(Crawford, 1896, p. 312; Merrill, 1919, p. 531; Tucker, 1929, p. 483; 1945, pl. 35).
	Long Shot #1				See Long Gray (t)

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lone Star	Sec. 7, T2S, R12E, SBM.	Undetermined	Undetermined	Patent survey no. 6330, tied to U.S. Mineral Monument no. 202; surveyed in 1945 (Saul 1962, p. 7).
	Los Angeles				See Brooklyn mine (B)
	Los Pirralles				See Hill mine (H)
	Lucky Boy				See Elton mine (E)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lucky Lady (group)	Sec. 17, T3S, E R11# SBM (proj.). A	Undetermined	Undetermined	(Tucker and Sampson, 1945, pl. 35) not confirmed.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lucky Lady claim	SE 1/4 sec. 19 (proj.), T7S, R17E, 'SBM.	Undetermined	Property not visited; probably resembles nearby Aztec and Rainbow claims which are northwest-trending gold-bearing quartz veins in gneissic country rock.	Developed during 1930's and worked for an unreported but probably short period. Explored by single shaft 75 feet deep from which an unspecified amount of ore of good grade was taken (J. Dupont, personal communication, April, 1959).

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lucky Strike	Sec. 7, T6S, R15E, SBM, in the Chuck-walla Mts.	Undetermined	Undetermined	Claim and mill site; patent survey no. 6400, tied to U.S. Location Monument no. 205; surveyed in 1947 (Saul 1962, p. 7).
	<i>Haney</i>				<i>See Deed Q. (6)</i>

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	McKinley Bill claim)	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Meek (group)	Sec. 15, T2S, R11E, SBM (proj.).	Undetermined	Undetermined	(Tucker and Sampson, 1945, pl. 35). Not confirmed.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Mineral Chief claim				See Golton group.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Minnie Ha-Ha claim)	NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 32, T6S, R4E, SBM, about 2 miles east-southeast of Kenworthy.	E. M. and Hazel A. Olsen, 14548 Dalman, Whittier (1958)		County and Forest Service records. See Van Dyke's map See Tubbs' map under "gold" See Kluge's map
	Kluge's claim				

Gold
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Mountain King	N $\frac{1}{2}$ sec. 29(?), T4S, R20E, SPM.	Undetermined	A vein reported to be as much as 30 feet wide strikes northwest. County rock is granite porphyry.	Developed through a 40-ft. shaft and 4 open cuts (Aubury, 1908, p. 342; Tucker, 1929, p. 471).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Musick (claim)	NE $\frac{1}{4}$ sec. 23, T5S, R4W, SBM, west side of Railroad Canyon, about 4 $\frac{1}{2}$ miles _x northeast of Elsinore.	Undetermined	Quartz veins 1-2 in. wide strike N. 5°-20°W. dip about 70°NE. parallel to parting planes of slate.	Workings, now caved, comprise a shaft 40 ft. deep and shallow pits and trenches. (Engel, 1959, p. 117).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Nicolite (claim)	Sec. 32, T1S, R24E, SBM.	Undetermined		(Tucker, 1945, pl. 35).
	Northern B.				See Santa Rosa mine (1)

Gold

Riverside

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	North Star (claim)	Sec. 33, T4S, R4W, SBM.	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	O'Brien (mine)	Sec. 16(?), T4S, R4W, SBM, about 4½ miles northeast of Elsinore and 1 mile west of Good Hope mine.	Undetermined		(Crawford, 1894, p. 224; Engel, 1959, p. 118).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ohio (claims)	NE $\frac{1}{4}$ sec. 1, T2S, R22E, SBM, at the southeast margin of the West Riverside Mtns.	R. F. Boyd and A. Geiger, Vidal (1958)	Gneiss cut by thin pegmatite dikes and quartz veins. Explored dike attitude approximately N.45°E., 70°SE.; composed of quartz, microcline, chlorite, calcite, and hematite.	A single, shallow, inclined shaft explored a poorly exposed pegmatite dike.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	O K Claim				See McKinley Bill.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Onward mine Zphir	T2S, R19 or 20 E(?) SBM, probably in the Arica Mtns.	Undetermined		(Crawford, 1894, p. 224). See Lucky Strike (t)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Opulent (mine)	T6S, R14E(?), SBM.	Undetermined	Wulfenite noted here by Orcutt in 1888.	(Orcutt, 1890, p. 901).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Oro Copio (mine)	Reported to be in sec. 6, T2S, R10E, and sec. 12, T2S, R9E, SBM (proj.), about 9½ miles southeast of Twentynine Palms in the Pinto Mtns. - Gold Park area.	Undetermined	Narrow quartz veins striking N.10° E. in a shear zone in granite gneiss.	Three shafts, 50, 75, and 100 feet deep respectively, sunk on veins. Apparently active in 1921 when owned by Gold Park Consolidated Mines Co. and 1921-29. Last reported owned by Ellsworth Nickols, Santa Ana. (Tucker, 1921, p. 348; Tucker and Sampson, 1929, p. 486).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Oro Plomo (group)	T Sec. 19, W4S, R22E, (proj.) SBM, on the west side of the Big Maria Mountains	Undetermined	Quartz vein in gneiss and schist.	Eight shallow shafts and several cuts. (Unpublished report).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Oro Vista (mine)	Sec. 28, T7S, R5E, SBM, 6 mi. southwest of Nightingale.	Undetermined	Quartz vein on granite-schist contact.	(Tucker 1945, p. 141, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Owens (claim)	NE $\frac{1}{4}$ sec. 5, T5S, R4W, SBM, 3/5 mile due east of Good Hope mine.	William A. Owens, Route 2, Box 228E, Perris	Diorite aplite dike 3-5 ft. wide trends N. 10° E., discontinuously exposed for 100 yards or more through deeply weathered quartz diorite.	Gold sought in 4 shallow pits and shafts now largely caved in line trending for 75 yards N.25°E. across aplite dike. Deepest shaft is 30 ft. (Engel, 1959, p. 118).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Oxbow (Group)	Sec. 36, T1S, R23E, SBM, in the River-side Mountains.	John H. Ware, 408 N. 9th St., Santa Paula (?)		This group appears to have been adjacent to or near the Gold Dollar (see herein). A claim named "Oxbow" is held (1958), in addition to the Gold Dollar, by J. H. Ware (Merrill, 1919, p. 544; Tucker, 1929, p. 486; 1945, pl. 35; county records).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Perris (claim) Pilot	Sec. 31, T4S, R4W, SBM.	Undetermined		(Crawford, 1896, p. 313; Merrill, 1919, p. 531; Tucker, 1929, p. 486; 1945, pl. 35). See Triangle (t)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Pinto Lode (claim)	Sec. 24, T6S, R4E, SBM, in Palm Canyon	Undetermined		(Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Pinto placers	Sec. 21, T2S, R12E, SBM.	Undetermined		(Tucker, 1945, pl. 35).
	Pinger Well				See New Elmore mill (c)
	P. Bay				See Cap Hunter (c)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Porcupine (claim)	T2S, R12E(?), SBM.			(Merrill, 1919, p. 537).
	Postmaster				See Jan (t.)
	Priest				See Brown (t.)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Punch (claim)	T8S, R21E(?), SBM, probably on the east slope of the Mule Mountains.	Undetermined		(Merrill, 1919, p. 541).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Purple Hope (Bob Cat No. 1)	SE $\frac{1}{4}$ sec. 24, T5S, R5W, SBM, on the north side of a prominent hill, about 2 $\frac{3}{4}$ miles east of Alberhill.	H. L. Long, W. E. Giles, M. Isaac, G. J. Isaac, 8232 South Nutwood Street, Anaheim (1953).	Metamorphosed tuff and related volcanic sediments; strike N.35°W., dip 60° SW.; form prominent outcrop in a shattered zone which is bleached and stained, iron and manganese oxides and includes abundant clayey gouge.	Explored by inclined shaft driven northwest; caved at 6-ft. depth; 15-ft. trench with 8-ft. face; several shallow pits. (Engel, 1959, p. 118-119).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ragged Top group	NW $\frac{1}{4}$ sec. 18, T6S, R3W, SBM, in Cottonwood Canyon, 3 miles east of Elsinore.	Undetermined	Quartz veins in granitic rock.	Two adits 500 ft. apart driven 50 and 60 ft. SE. (Tucker, 1929, p. 486).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ramona mine				See Ingersoll mine

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Red Bird No. 1	SE 1/4 sec. 24, T5S, R5W, SBM, on the northeast side of prominent hill about 2 3/4 miles east of Alberhill.	A. W. Meier and J. Taylor, address not determined (1947)	Metamorphosed tuff and related volcanic sediments about 100 yards east of contact with quartz latite porphyry. Dike-like outcrops trend N. 30° W., dip 60° W.	Explored and mined in open pit 20 ft. deep, 25 ft. wide, 35 ft. long and smaller pits. (Engel, 1959, p. 119).
	Red Head				Red Cloud gray (±)

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Reliance	Sec. 25, T1S, R23E, SBM, on the north-west slope of the Riverside Mts.	Undetermined	Undetermined, probably schistose rocks cut by faults mineralized with primary and secondary copper minerals, gold and iron oxides.	Four claims; Fraction #2, Independence, Klondyke, and Reliance were patented in 1922, by W. F. Holt, as the Reliance group.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Republican claim	T29, R12E, 6BM.	Undetermined		(Merrill, 1919, p. 538).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Revenue claim	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Richey (mine)				See Coffee (mine)
	Ronnie B				See Allhuta (t)
	Rosario				See Santa Rosa (t)
	San Diego				See Gold Crown (t)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	San Jacinto claim	SE $\frac{1}{4}$ sec. 10, T5S, R4W, SBM, north-west side of Highway 84 about $\frac{1}{4}$ mile northeast of Good Hope mine.	Mrs. Velma L. Teater, 500 South Commonwealth, Los Angeles (1955)	Northeast extension of Good Hope vein.	Claim of Good Hope group. (Tucker, 1945, plate 35; Engel, 1959, p. 119).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	San Mateo Canyon prospects) Santa Fe	T8S, R5 and 6W, SBM, lower San Mateo Canyon for about a mile north of its junction with Nickel (Quail) Canyon, and several miles south of that point.	Undetermined	Granodiorite and andesite porphyry contain unproved showings of gold, silver copper and iron.	Prospected intermittently since about 1900. Accessible by jeep since late 1940's. Most of this property appears to lie south of the Riverside-San Diego County boundary (Larsen, 1948, p. 132; 1951, p. 48; Engel, 1959, p. 119). See Roosevelt and Reimbo (113

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Schiller (claim)	T2S, R12E, SBM.	Undetermined		(Merrill, 1919, p. 538).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Senate (mine)	T8S, R21E(?), SBM, probably on the east slope of the Mule Mountains.	Undetermined		(Merrill, 1919, p. 541).
	Sippi				See Last Page! (t)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	S. S. Mine	T2S, R12E, SBM, "4 miles south of Virginia Dale".	Undetermined		Reported as a long abandoned mine which once produced some good ore. (Crawford, 1894, p. 224; 1896, p. 314; Merrill, 1919, p. 538; Tucker, 1929, p. 487).
	Star				See map Hall (2)
	Stake				Top of the mine (1)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Storm King #5 (claim) Summit	Sec. 2, T29, R12E, SBM.	Seeley W. Mudd and Philip Wiseman (1938)	Free gold in steeply dipping quartz vein striking N. 20° E. along andesite porphyry-quartz monzonite contact.	This is part of holdings which lie in both Riverside and San Bernardino Counties (see O.K. Miner: Wright, 1953, p. 50). Vein explored to depth of 800 ft. by inclined shaft and extensive level workings. (Cloudman, 1919, p. 802; Eric, 1948, p. 313; Tucker, 1930, p. 246; 1931, p. 306; Wright, 1953, p. 50). See R. to G. Gold (1)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Sunny Boy Claim	Sec. 6, T2S, R9E, SBM.	Undetermined		Was not identified in the field but may now be part of the Desert Queen mine (see herein). (Tucker, 1945, pl. 35).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Sunnyside mine	T6 or 7S, R14 or 15E, SBM.	Undetermined	Quartz vein carrying argentiferous lead ores with gold.	Shaft. (Orcutt, 1910, p. 901; Merrill, 1919, p. 539; Tucker, 1929, p. 488).
	Sunrise				See Zulu Quartz (t)
	Sunset				See Forty Gold (t)
	Sunset				See North Star (t)
	Thelma				See Klock mine and Desert Gold (t)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Thurman (claims)	Secs. 19 and 26, T6S, R3W, SBM.	J. G. Thurman, Elsinore (1929)	A porphyritic dike 4 ft. wide in schist strikes N. 20° W., and dips 70° E. Reported to run \$4 per ton in gold.	One small open cut. Mr. Thurman had other claims which see herein under Lake View prospect. (Tucker, 1929, p. 488; 1945, pl. 35).
	Tingman-Holl				See Tingman (L)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Tyler's diggings	Sec. 10, T6S, R4W, SBM, about 2½ miles east of Elsinore.	Undetermined		Reported active in 1876. (Merrill, 1919, p. 527; Engel, 1959, p. 120).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
25	Prospect (Name undetermined)	SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 4, T5S, R5W, SBM. In the Gavilan Hills, 1 mile southeast of Estelle Mtn.	Undetermined	Irregular shaped body of Jurassic quartz latite porphyry about 1,500 feet long, 500 feet wide and surrounded by Cretaceous granodiorite. At granodiorite contact the east margin of the quartz latite porphyry contains iron oxides and thin quartz stringers which strike N.60°W., dip 45°SW.	Quartz stringers explored by means of a side hill cut 15 feet deep and 20 feet wide and several other shallow cuts. Apparently long idle.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
28	Prospect (Name) Undetermined	NW 1/4 sec. 4, T5S, R5W, SBM. In the Gavilan Hills north of Estelle Mtn. Road, 1 mile east of Estelle Mtn.	Undetermined	Shear zone in altered volcanic rock is 1-1 1/2 feet wide, strikes N.60°W., dips 83°SW. at surface, vertical at depth. In porphyritic andesite tuff or breccia (Jurassic Santiago Peak Volcanics). Volcanics are stained red-brown or purple-gray and contain thin, black, manganese seams.	Shear zone explored by means of a vertical shaft, estimated to be about 100 feet deep. A small open cut 10 feet deep and 15 feet long is just west of the shaft. In January 1963 no equipment remained on the property which apparently has been long idle.

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unidentified prospects	W $\frac{1}{2}$ sec. 23, T5S, R4W, SBM, about 4 $\frac{1}{2}$ miles northeast of Elsinore.	Undetermined	Schist and slate cut by northeast-trending faults and northwest-trending aplitic and alaskitic bodies. Quartz in shear zone.	Trenches in a linear series nearly $\frac{1}{2}$ mile long. (Engel, 1959, p. 120-121).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unidentified prospect	N $\frac{1}{2}$ sec. 14, T5S, R4W, SBM, about 7 miles northeast of Elsinore.	Undetermined	Glassy quartz vein 3 ft. wide strikes north, dips 70°-80° W. in bedding plane of slate. Septum of decomposed granitic rock divides vein.	Gold sought in vertical shaft on vein 50 ft. or more deep. (Engel, 1959, p. 121).

Gold
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unidentified prospect	SE $\frac{1}{4}$ sec. 15, T5S, R5W, SBM, about 1/3 mile northeast of Alberhill.	Undetermined	West-trending fault zone in meta- volcanic rocks.	Prospected by a 10-ft. adit. (Engel, 1959, p. 121).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Undetermined Unidentified prospect	NE $\frac{1}{4}$ sec. 22, T5S, R5W, SBM, about 3/4 of a mile east of Alberhill.	Undetermined.	Sheared, weathered shale, and slate strike N. 30° W., dip 60° NE.	Prospected by 185-ft. crosscut adit. (Engel, 1959, p. 121).
	Walker				See <u>Walker</u> (6)
	Walker				See <u>Walker</u> (6)
	Walker				See <u>Lucky</u> (6)

Gold

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Waterloo	Sec. 25, T3S, R14E, SBM, on the east slope of the Eagle Mts.	Sold to the State of California in 1918	Undetermined	Patent survey no. 4872 listed as Gray Eagle, tied to U.S. Mineral Monument no. 141 (Saul 1962, p. 7).

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Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	White Star (claim) White Wing	Sec. 12, T2S, R10E, (proj.), SBM.	Undetermined		(Tucker, 1945, pl. 35). See Red Cloud (c)

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Willow (mine)	T6S, R15E, SBM, 5 miles northwest of Corn Springs.	Undetermined	Quartz and calcite vein from 6 inches to 4 feet wide strikes west and dips 30° south.	Developed through 30-ft. inclined shaft and open cuts along outcrop through a distance of 750 ft. (Tucker, 1929, p. 489).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Winchester Place	SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 29, T6S, R4E, SBM., about 2 miles east-southeast of Kenworthy Guard Station.	Raymond E. and Ceba E. Noble, 209 Taylor Ave., Montebello (1958)		(Forest Service records; county records).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Wrench (prospect)	S $\frac{1}{2}$ sec. 34, T5S, R4W, SBM, about 2 $\frac{1}{2}$ miles northwest of Elsinore.	J. H. Wrench, Elsinore (1937)	Quartz stringers strike N. 70° W., and dip 45° NE. roughly parallel with the fracture of quartzite and slate in a zone 3-4 ft. wide.	Worked through open cut 10 ft. wide, 20 ft. long, now caved to average depth of about 5 ft. Dump suggests concealed underground workings. (Engel, 1959, p. 120).

Gold

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Yucca Buttes	Sec. 10, T5S, R11E (proj.), SBM.	Undetermined		(Tucker, 1945, pl. 35).

Gypsum

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Barth (Prizer)	Undetermined: Reported (Ver Planck, 1952, p. 124) location in sec. 2, T4S, R7W, SBM, doubtful	Undetermined	Area covered by alluvium.	Location may have been for a grinding or storage area; gypsum probably obtained from Eagle Canyon-Tin Mine Canyon gypsite belt in nearby Santa Ana Mountains. Operation by H. A. Prizer in 1909 and W. C. Barth in 1914. Reported small production of agricultural gypsite in 1909, 1914, and 1917. (Merrill, 1917, p. 597; Ver Planck, 1952, p. 124-125; Gray, 1961, p. 115).
	Capital Dome				2. Main Street Canyon (1)

Gold Gypsum

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	El Cerrito Ranch	Undetermined	Undetermined		A small tonnage of gypsite reported produced in period 1915-1917 for private agricultural use. Probably mined from Eagle Canyon-Tin Mine Canyon gypsite belt about 3 miles south and southwest of Corona in Santa Ana Mountains. (Merrill, 1917 (1919) p. 579; Ver Planck, 1952, p. 135; Gray, 1961, p. 115).
	Frager				See Eagle Canyon (+)
	Freeman-Nonhof				See White Gypsum and Big Chert
	Garbutt and Orcutt				See Maria Mountains
	Garland				See Maria Mountains
	Gypsum Canyon				See White Sh. T. Canyon
	Langdon				See Maria Mountains

Gypsum

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Omei (claim)	S $\frac{1}{2}$ sec. 9, T4S, R7W, SBM, north-eastern flank of Santa Ana Mountains, 3 $\frac{1}{2}$ miles southwest of Corona	Mrs. B. I. Markwell, 1001 N. Lowell St. Santa Ana (1957)	See White gypsum group	(Gray, 1961, p. 116).
	Parkford				See Riverside Mountains deposit (t)
	Prizer				See Barth (t)
	Red Bull				See Hagerdorn Canyon (t)
	Savage				See Maria Mountains (t)
	Ware				See White Gypsum and Top Chief (t)

Riverside Co.

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Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Little Maria (Randolph & Hamilton?)	W $\frac{1}{2}$ sec. 29 (proj.), T3S, R20E, SBM, in Little Maria Mountains about 5 miles north of the Arlington Black Jack manganese mine.	Undetermined	A body of magnetite of undetermined but probably relatively small dimensions, is exposed in an area largely underlain by carbonate-rich rocks of the Maria Formation.	This deposit has probably been known for many years, but the only report which might be supposed to allude to it is about a copper claim, the Randolph and Hamilton. (Merrill, 1917, p. 525).
	Mountain Mountaine Iron deposit				See Iron Cap claims (L)

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Lead-Silver-Zinc

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Lead King	Sec. 7, T6S, R16E, SBM in Chuckwalla Mtns.	P. E. Gates, Los Angeles (1949)	Undetermined	Small shipment to Wickenburg in 1949; smelter recovery 24.8% lead and 7 ounces of silver per ton (Goodwin, 1967, p. 603).

Lead - Silver - Zinc

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	MacLeish	Sec. 7, T5S, R20E, SBM., appears to be in central McCoy Mtns. area.	Undetermined	Undetermined	Ore shipped in 1918 showed a smelter recovery of 54.6% lead, 85 ounces of silver, 0.111 ounces of gold, and recover ^{portion} able copper. (Eric, 1948, p. 293; Goodwin, 1957, p. 604).

Lead - Silver - Zinc

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	McConkey	Sec. 7, T2S, R12E, SBM.	Undetermined	Undetermined	Ore shipped from Dale district in 1941 contained 6.25% lead, 11.5% copper; 2.25 ounces of silver, and 0.25 ounce of gold per ton. (Eric, 1948, p. 293; Goodwin 1957, p. 604).

Lead - Silver - Zinc

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Mecca	Sec. 7, T4S, R11E, SBM.	Undetermined	Undetermined	Pinion district, 47 miles from Mecca. Inclined shaft 250 feet deep; about 1000 feet of drifts. Between 1923 and 1928 about 1050 tons of complex sulfide ore was mined and shipped. Smelters recovery averaged 25% lead, 2.86% copper; 14.76 ounces of silver, and 0.452 ounce of gold per ton. (Eric, 1948, p. 293; Goodwin 1957 p. 604-605). See Bald Eagle (4)
	Neal				

Lead - Silver - Zinc

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Oro Mega	Sec. 7, T3S, R12E, SBM, 20 miles south east of Twentynine Palms at the base of the east slope of Pinto Mts., at edge of Joshua Tree National Monument.	F. E. Grover, 1223 West Bay Ave. Newport Beach (1950)	Undetermined	Development consists of 2 open cuts 60 feet by 600 feet by 3 feet, and 2 adits. Concentrates representing about 7% of the bulk ore were shipped to Selby in 1949-1950. Recoverable metal in the bulk ore has averaged about 2.88% lead; 0.92 ounce of silver, 0.08 ounce of gold per ton, and recoverable copper. Ore was milled at the Ivanhoe mill. (Goodwin, 1957, p. 606). /

Lead - Silver - Zinc

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palisade	Sec. 7, T5S, R20E, SBM.	Undetermined	Undetermined	Shipped ore in 1919; smelter recovery was 13.48% lead, 6.10% copper; 6.73 ounces of silver and some gold. (Eric 1948, p. 294; Goodwin 1957, p. 606).

Lead-Silver - ~~mine~~

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palisades Group	SE $\frac{1}{4}$ sec. 4, T6S, R4W, SBM, about 2 miles east of Elsinore.	George Peterson Elsinore (1929)	Sheeted, fractured zone, 2-3 ft. wide, strikes N.60°E., dips 50°SE° in deeply weathered diorite and gabbro. Associated with iron-stained dioritic dike and dark green diabasic and lamprophyric dikes. Limonite and secondary calcite occur in fractures. Ore minerals not visible, although unspecified quantities of silver, lead, copper, and gold reported in 1929.	Workings disposed for several hundred yards in a northeasterly direction, include inaccessible 30-ft. inclined shaft on sheeted zone and several shallow pits. Nearly $\frac{1}{4}$ mile northeast are several caved pits 4-7 ft. deep, and one 35-ft. adit in similar rocks. Production, if any, undetermined but small. (Eric 1948, p. 294, map; Tucker, 1929, p. 491; 1945, p. 148, pl. 35; Engel, 1959, p. 123).

Lead - Silver - Zinc

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Scott Lode No. 1	Sec. 7, T5S, R20E, SBM, 14 miles south of Rice. Seems to be an uncertain location. Distance from Rice suggests that it is same as Bald Eagle (see herein).	Undetermined	Undetermined	Developed by a 350-foot inclined shaft, 300-foot tunnel, and 120 feet of drifts. Shipped complex ore in 1924; smelter recovery was 24.82% lead, 5.72% copper; 16 ounces of silver, and 0.52 ounce of gold per ton. In 1934 2,100 tons of gold ore yielded 128.08 ounces of gold, 50 ounces of silver, 239 pounds of copper, and 1,108 pounds of lead. (Eric 1948, p. 295; Goodwin 1957, p. 607; U.S. Bureau of Mines records).

Lead - Silver - Zinc

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Winfield No. 2	Sec. 7, T4S, R10E, SBM, Eagle Mt. district, 55 miles northeast of Indio.	W. E. Covey, S.B. Mosher, Box 1135, Indio (1952) Operators: Scott & Lindsay, Box 154, Indio (1952)	Undetermined	Small shipment of complex ore sent to Selby in 1952; smelter recovery approximately 2.62% lead, 5.20% copper; 6.50 ounces of silver, 0.05 ounces of gold per ton, and some zinc. (Goodwin 1957, p. 608).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Big Hill	Sec. 6, T7S, R5E, SBM. Not confirmed (1963)			See Nightingale limestone in text. (Tucker and Sampson, 1945, pl. 35, no. 233; Logan, 1947, p. 272, pl. 37, no. 12).
	Barstow Canyon Deposits				See map in text. Barstow Canyon Deposits. (1)

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
320	Blue Diamond and Eagle	NW $\frac{1}{4}$ sec. 17, NE $\frac{1}{4}$ sec. 18, T4S, R1E SBM. San Jacinto Mountains about 2 miles northeast of Sobaba Hot Springs.	Harold V. Sims, P.O. Box 16, San Jacinto (1958)	Lenses of pre-Cretaceous gray to white crystalline limestone. Beds strike north to northwest.	In 1958 Mr. Sims held two unpatented claims in the NW $\frac{1}{4}$ sec. 17, Blue Diamond No. 1 and Eagle No. 1. By 1958 these deposits were undeveloped and were accessible by foot only.

Limestone
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Blythe Cement nos. 1 to 5	Published location (Logan, 1947, p. 270) appears to be in error; probably located in sec. 25, T3S, R19E, and sec. 30, T3S, R20E (proj.), SBM, on the south slope of the Little Maria Mts. about 4 miles north of the Arlington Black Jack mine.	Undetermined. (1963) Last reported owners W. V. and G. M. Neuman, B. F. and J. E. Rockhold, Martha B. and E. E. Schellenger, Mrs. Lulla Stearns and D. R. Hall, Blythe (1947)	Deposit in an area underlain by intensely folded and sheared carbonate rich rocks of the Paleozoic(?) Maria Formation. The central part of sec. 25 is underlain by a mass about $\frac{1}{2}$ mile wide of crystalline limestone with zones of siliceous dolomite and quartzite. This mass extends north into sec. 24 which is almost wholly underlain by these strata.	Five 160-acre association placer claims were located in 1928-29. Apparently <i>these</i> deposits are undeveloped. (Logan, 1947, p. 270).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Cameron Marble Co.	E $\frac{1}{2}$ sec. 14, T5S, R5E, SBM., 1 mile west of Rancho Mirage; and W $\frac{1}{2}$ sec. 30, T5S, R6E, SBM., 1 mile southwest of Palm Desert. Not confirmed, 1963.	Undetermined	Pre-Cretaceous crystalline limestone with biotite schist and gneiss. Dibblee (1945, plate 2) mapped a large body of undifferentiated Triassic and/or Paleozoic metasedimentary rocks (including limestone) in this area. In sec. 14 a bed of "marble" was reported to strike east, dip 25° S., to be 30 ft. thick, and to crop out for 2,500 ft. In sec. 30 a bed of "marble" 30 ft. wide was reported to strike N. 65° E., dip 23° S., and to crop out for 850 ft. This "marble" was reported to be creamy white with black and gray mottling, (Div. Mines Field Rept. 72, Riverside Co.).	In 1914 the Cameron Marble Co., 1022 California Bldg., Los Angeles, was reported to hold "marble" deposits at these locations. By 1914 only assessment work had been done and apparently the deposits have not been mined. (Dibblee, 1954, pl. 2; Div. Mines Field Rept. 72, Riverside Co.).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Carbonate Blank-et (4 placer claims)	Probably on N. slope of Little Maria Mts. about one to 1½ miles NW. of Midland.	Undetermined (1963). Might be held, all or in part, by U.S. Gypsum Co. Last reported owners W. V. and G. M. Neuman, B. F. and J. E. Rockhold, Martha B. and E. E. Schellinger, Mrs. Lulla Stearns and D. R. Hall. Blythe, (1947)	Deposit on or near the north margin of a structurally-complex exposure of mixed carbonate, gypsiferous, calcsilicate, and schistose rocks of the Paleozoic(?) Maria Formation. About 1½ miles northwest of Midland is a metamorphic rock mass as much as ¾ mile wide and several miles long composed mostly of siliceous dolomite with quartzite, but also with zones of crystalline limestone.	Four association placer claims were located in 1928-29. Apparently the carbonate rocks are undeveloped. (Logan, 1947, p. 270).

Limest.
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
321	Chino Canyon Deposits	E½ sec. 6, W½ sec. 5, T3S, R4E, SBM. Along the north side of Chino Canyon near the west boundary of the City of Palm Springs.	Sec. 6 is within the Agua Caliente Indian Reservation; sec. 5 is owned by the Southern Pacific Co., 65 Market St., San Francisco 5.	Interbedded pre-Cretaceous schist and carbonate rocks intruded by granitic rocks. Numerous beds of crystalline limestone strike north to northwest and dip about 50° east. Major carbonate-bearing zones range from 500 to 1,500 ft. in length and are as much as 100 ft. wide.	Deposits have not been developed. The small size of individual limestone bodies and the nearness of Palm Springs probably precludes commercial development.

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
323	Eden Hot Springs Limestone Deposit	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25, T3S, R2W, SBM. About 9 miles northwest of San Jacinto, 3/4 mile southeast of Eden Hot Springs at the base of the steep west face of Mt. Eden.	Thos. D. McTavish, Route 1, Box 82, Camarillo (1945). Undetermined (1963)	Pre-Cretaceous limestone, the northwestern extension of a sequence of metamorphic rocks mapped by Fraser (1931, plate facing p. 540) as Paleozoic or older. White to gray, medium to coarsely crystalline limestone mass strikes northwest, dips about 40° NE. Limestone mass is probably more than 1,000 ft. long and 200 to 300 ft. wide.	In 1929 the deposit, which is on private land, was owned by Eden Hot Springs, Inc. The deposit appears to be high-grade white limestone. Previous reports state that the CaCO ₃ was reported to be 98%. Apparently this deposit has not been mined as no evidence of development work was observed in July, 1963. (Tucker and Sampson, 1929, p. 515; Tucker and Sampson, 1932, p. 6, pl. 1; Tucker and Sampson, 1945, p. 172; Logan, 1947, p. 271). 1. Old city of San Jacinto To San and Santa (San Jacinto) 185

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
22	Fingal Deposit	Sec. 17, T3S, R3E, SBM. North-trending spur at the north margin of the San Jacinto Mtns., one mile southeast of Fingal.	Undetermined	Pre-Cretaceous limestone interbedded with mica schist and granitic gneiss. Band composed mostly of limestone, about 2,500 ft. long and 100 ft. wide, strikes northwest, dips 65° NE.	Narrow band of limestone cuts across a spur just south of the center sec. 17, mostly in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 17. Apparently undeveloped.

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Harris	Sec. 9, T7S, R5E, SBM. Not confirmed (1963)			See Nightingale limestone in text. (Tucker and Sampson, 1945, pl. 35, no. 236; Logan, 1947, p. 271).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
32	Hubbard Limestone Deposit	S $\frac{1}{2}$ sec. 24, T4S, R1W, SBM. About 3/4 mile northwest of Soboba Hot Springs, on the steep west face of the San Jacinto Mountains, northeast side of State Highway 79.	W. F. Rohland and Mary Heinsen, Gilman Hot Springs, (1945) Undetermined (1963)	Pre-Cretaceous, medium to coarse crystalline white limestone lens in a large mass of Pre-Cretaceous metamorphic rocks, which are mostly schist and quartzite. Limestone strikes N. 40° W., dips 18° NE. One of a number of limestone lenses in the large metamorphic rock mass that extends about 8 miles northwest from Soboba Hot Springs to just beyond Lamb Canyon.	Limestone was mined from an open cut 75 ft. long with face 20 ft. high, located at the head of a steep, narrow ravine about 1,000 ft. above Highway 79. Property was owned and operated by the Snowflake Lime Company, probably about 1900, and supplied limestone to a steel-shell limekiln which still stands near Highway 79. Tucker and Sampson (1945, p. 173) report that the limestone was blasted and allowed to roll down the canyon to the kiln. Early day residents, however, state that the limestone was lowered to the kiln by means of a cableway tram, but no trace of such an installation remained in 1963. The lime is said to have been used extensively for building mortar throughout southern California. By 1929 the quarry was owned by Omar H. Hubbard, Long Beach, but had been idle for some years and has not since been operated. (Tucker and Sampson, 1929,

p. 516; Tucker and Sampson, 1932, p. 7; pl. 1

Tucker and Sampson, 1945, p. 271; Logan, 1947, p. 173, 174

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Limestone

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MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
332	Mt. Edna Deposit	SW $\frac{1}{4}$ sec. 28, T3S, R1E, SBM. 4 miles south of Banning, on the southwest face of Mt. Edna at the Colorado River Aqueduct, north side of the old Banning-Idyllwild Road.	Undetermined	Limestone body occurs with pre-Cretaceous mica schist, a pendant in bouldery granite. Gray to white, medium to coarse crystalline limestone strikes northwest, appears to dip northeast. Limestone mass is about 2,500 ft. long, 250 to 500 ft. wide.	West edge of deposit has been explored by a road-like dozer cut about 500 ft. long. Apparently no production and no recent activity.
	North Hill Quar.				See Old City Quarry under Rock Products (Enoch and Caudill & Stone) t

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
336	Novelle Limestone Deposit	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 26; NE $\frac{1}{4}$, NE $\frac{1}{4}$ sec. 27, T3S, R3E, SBM. Steep northern margin of San Jacinto Mtns., about one mile south of Palms Springs Station, in the City of Palm Springs.	George A. Novelle, Monrovia (1932) Undetermined (1963)	Series of interbedded pre-Cretaceous schist and carbonate rocks intruded by granitic rock strikes N. 50° W., dips 55° NE. In the northwest corner of sec. 26 and the northeast corner of sec. 27 is a mass of blue to gray coarse crystalline limestone about 1,500 ft. long and 900 ft. wide, but also contains some dolomite and interbedded schist. In addition thin limestone beds in mica schist crop out at several places in the northern half of sec. 26.	In the late 1920's George Novelle held all of sec. 26. By 1945 the property was reported to have reverted to the public domain. Apparently this deposit has not been mined; the nearness of Palm Springs probably precludes its exploitation. (Tucker and Sampson, 1929, p. 516-517; Tucker and Sampson, 1932, p. 8, pl. 1; Tucker and Sampson, 1945, p. 173; Logan, 1947, p. 272).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Old City Quarry (Fairmount Hill Quarry, North Hill Quarry)				See under Rock Products, Broken and Crushed Stone.

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palm Springs Canyon	Secs. 25, 36, T5S, R4E, SBM. In Palm Springs Canyon, about 9 miles south of Palm Springs. Not confirmed (1963).	Undetermined	A large mass of pre-Cretaceous metamorphic rock crops out along the east side of Palm Springs Canyon. The sequence strikes north and dips 35° E. The metamorphic series is mostly mica schist, but contains minor amounts of limestone and quartzite (Fraser, 1931, plate facing p. 540).	In 1945 Tucker and Sampson (no. 243, plate 35) listed a limestone deposit at this location. Apparently it is undeveloped. (Fraser, 1931, plate facing p. 540; Tucker and Sampson, 1945, plate 35).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palo Verde Dam Quarries				See in text under Rock Products, Broken and Crushed Stone.

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Pinyon Flat	Secs. 5, 6, T7S, R5E, SBM. Not confirmed (1963)			See Nightingale limestone in text. (Merrill, 1917, <u>1919</u> , p. 551, fig. 4; Logan 1947, p. 272, pl. 37, no. 12).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
337	Potrero Creek Deposit	W $\frac{1}{2}$ sec. 34, T3S, R1W, SBM. 4 $\frac{1}{2}$ miles due south of Beaumont and 1 mile west of San Jacinto Nuevo y Potrero	Riverside Cement Company, Division of American Cement Corporation, mill office, P.O. Box 832, Riverside (1962)	At least 5 limestone bodies occur in a mass of pre-Cretaceous metamorphic rock (mostly schist and quartzite) which crops out as an irregularly shaped mass in the central part of sec. 34. This metamorphic rock mass is about 1 mile long and ranges from $\frac{1}{4}$ to $\frac{3}{4}$ mile in width. Gray to white, medium to coarse crystalline limestone bodies strike northwest and dip 50°-60° NE. The two largest limestone bodies, about $\frac{1}{2}$ mile apart, appear to be from 1,000 to 1,500 ft. long and 250 to 500 ft. wide.	Local residents report that limestone was transported from this deposit about 1900-1915 by pack mules and presumably was burned locally for building lime. The principal limestone bodies have been explored or mined from a number of small cuts. About 1960 the Riverside Cement Company explored the property and did some drilling, but in 1963 the deposit remained idle.

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Schellinger (Schellenger)	Sec. 22, T3S (proj.) R21E, SBM, on the north slope of the Big Maria Mts., about 2½ miles NE. of Styx	Undetermined (1963) Reported probably to have reverted to public domain (1945).	Deposit part of an east-west trend- ing belt about 1 mile long and ½ mile wide of mixed carbonate-rich rocks. White to gray, coarsely crystalline limestone of the Paleo- zoic(?) Maria Formation. Reported (Tucker and Sampson, 1945, p. 174) to be 200 feet thick and to have shown, by analyses, to be 98.45 per- cent calcium carbonate and 0.25 percent "magnesia".	Apparently undeveloped. (Tucker and Sampson, 1929, p. 520-521; Tucker and Sampson, 1945, p. 174, pl. 35). <i>See Lamb Canyon report</i>

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
343	Southern Pacific Deposits	S $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 23, T3S, R3E, SBM. North margin of the San Jacinto Mtns., 3/4 mile south of Palm Springs Station; and SE $\frac{1}{4}$ NW $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, sec. 25, T3S, R3E, SBM. on each side of the mouth of Blaisdell Canyon, about 1 mile south of Windy Point.	Southern Pacific Company, 65 Market Street, San Francisco 5, owns all of sec. 25 and all of sec. 23 except the NW $\frac{1}{4}$ SW $\frac{1}{4}$.	Series of pre-Cretaceous mica schist, granitic gneiss, and limestone. The limestone is white to gray and medium to coarsely crystalline. Part of the limestone is massive and uncontaminated with other sediments, but in places it is contaminated by granitic dikes, dolomite, and schist. A metamorphic mass in sec. 23 consisting mostly of limestone strikes about N. 50° W., dips 65° NE., and has maximum dimensions of 2,750 ft. by 1,250 ft. This mass is the southeast extension of the Guiberson deposit (see herein). The principal limestone-bearing sequence in sec. 25 lies in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ and has maximum dimensions of 1,500 ft. by 900 ft. The beds strike N. 10-15° W., dip 65° NE. Three limestone beds in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25 range from 1,250 ft. to 1,750 ft. in length and are 200-250	Apparently no production from these deposits. The nearness of Palm Springs probably precludes their commercial exploitation. (Tucker and Sampson, 1929, p. 521; Tucker and Sampson, 1932, p. 8, pl. 1; Tucker and Sampson, 1945, p. 174; Logan, 1947, p. 273-274).

ft. wide, separated by 250 to 400

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Whitecap Limestone No. 1 and No. 2	SW $\frac{1}{4}$ sec. 29, W $\frac{1}{2}$ sec. 31, sec. 32 (proj.) T3S, R21E, SBM, one to two miles NE. of Midland in the Big Maria Mts.	Undetermined (1963). Probably held at least in part by U.S. Gypsum. Last reported owners W. V. and G. M. Neuman, B. F. and J. E. Rockhold, Martha B. and E. E. Schellenger, Mrs. Lulla Stearns, and O. R. Hall, Blythe (1947).	Deposit part of an east-west trending belt of mixed, carbonate-rich rocks of the Paleozoic(?) Maria Formation. 160-acre placer locations reported (Logan, 1947, p. 274) to be on high calcium limestone. The SW $\frac{1}{4}$ of sec. 31 (proj.) is underlain by crystalline limestone.	Two 160-acre placer locations made in 1928. Apparently the limestone deposits are undeveloped. (Logan, 1947, p. 274).

Limestone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Whitewater Deposit				See Guiberson deposit.
	Nichols				Magnesite See Hemet Magnesite mine. ()

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Black Bird</i> <i>Black Eagle & Newfist</i> Black Horse group;	Sec. 24(?), T4S, R19E, SBM. Four claims just west of Black Jack mine.	Undetermined	Mn oxides in narrow veins in rhyolite (granite porphyry).	<i>see Arlington - Black Jack (t)</i> <i>see Best - NE 61/141 (t)</i> Probably in part the same as the Manganese Canyon group (see herein). (Bradley, 1918, p. 56; Tucker, 1929, p. 492). <i>see Arlington - Black Jack</i>
	Black Jack				201

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Box Canyon Manganese deposit	Sec. 24, T6S, R10E, SBM. 1/8 mile west of Shavers Well.	Leland Noblitt, Brawley (1945)	Manganese oxides and quartz in irregular bodies in schist.	This deposit probably similar to the Big Bullett claims (see herein). Developed by shallow, open cut. (Tucker 1945, p. 150, pl. 35; Trask, 1950, p. 182).

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Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bray Mine) Bramant Newport	Sec. 19 (proj.), T4S, R20E, SBM, about 1000 ft. south of Black Jack group.	Undetermined	Probably similar to Black Strike (see herein).	Reportedly yielded 44 percent Mn ore in 1918. May be same or near Black Strike (see herein). (Bradley, 1918, p. 56; Tucker 1929, p. 493; Trask 1950, p. 178).

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~~Gold~~ Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Clark and Losekamp prospect	SW part of T5S, R1W, SBM, 4 miles southeast Winchester.	Undetermined	Manganese oxides in bedded rocks.	(Trask, 1950, p. 182).
	Dioxide Manganese Silvane Quint Chief				see Longdown (1) see Bar (1) (6) (11) see Yellow Stone (1)

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Groce (mine)	Sec. 19 (proj.), T4S, R20E, SBM.	Undetermined	4-8 inches of high-grade Mn oxides in faulted granite porphyry.	Probably the same property as Black Strike (see herein). Ore reported shipped from this property in 1918. (Tucker, 1929, p. 493; Trask, 1950, p. 174-179).
	Groose				See Black Strike (1)
	Mahony & Brown				See Lexington (1)

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Noblett Manganese (claim)	Sec. 23, T6S, R10E, SBM.	Probably Leland Noblett, Brawley (1945)	Probably similar to Big Bullett claims (see herein).	(Tucker 1945, pl. 35). <i>See Lucky Boy (H)</i>
	<i>Paddy Fossil</i>				

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palen Mountains deposit	T4S, R18E(?) SBM.	Undetermined		(Bradley, 1918, p. 59; Trask, 1950, p. 185).

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Palo Verde Region	8 mi. NW.(?) of Palo Verde.	Undetermined		Claims reported in 1918 as belonging to Lugo and Justice Smith of Palo Verde appear to be mislocated and probably lie in Imperial Co. southwest rather than northwest of Palo Verde. May be the Lugo (Lost Donkey, Palo Verde) claims. (Bradley, 1918, p. 59; Tucker 1929, p. 494; Trask, 1950, p. 76-77).

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Parsons (mine)	Sec. 19 (proj.), T4S, R20E, SBM, probably just south of the Black Strike (see herein).	Undetermined	Manganese oxide vein as wide as 2.5 feet in fault-breccia zone in granite porphyry.	Developed through 100-foot shaft with drifts on three levels. By 1918 property had yielded 500 tons of ore. (Trask, 1950, p. 179).

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Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Pinkham (prospect)	T6S, R9E, SBM, 10 miles east of Mecca.	Undetermined		Apparently little more than a prospect, reported in 1916 as "indications of ore are said to be blocks of float of manganese oxide". (Trask, 1950, p. 185).

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Robinhood No. 4	NE $\frac{1}{4}$ sec. 33, T5S, R4W, SBM, about 1 $\frac{1}{2}$ miles southeast of highway 74 and about 2 miles northeast of Elsinore.	Giles D. and Eunice M. Robbins, 2754 $\frac{1}{2}$ Nebraska Avenue, South Gate (1942)	Triassic Santa Ana (Bedford Canyon) chloritic shaly slate contains 3-ft. wide manganiferous siliceous layer along bedding. Manganese oxide replacement of rhodonite and black stained quartz. Manganiferous layer massive except 6 in. of parallel banding on each border suggests layering, possibly of chert beds.	Exposures limited to 10-ft. trench with 7-ft. face; 3-ft. pit 50 ft. southeast on same lense, and 10-ft. long outcrop of similar material 30 ft. to southwest and 100 ft. south of trench. No production. (Engel, 1959, p. 124-125).

Santa Ana

See Manganese Canyon

Manganese

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unnamed prospect	NW $\frac{1}{4}$ sec. 34, T5S, R4W, SBM, 2 miles southeast of Highway 74 and 2 $\frac{1}{8}$ miles northeast of Elsinore.	Undetermined	Manganese oxides in siliceous bed 4 $\frac{1}{2}$ ft. thick with quartz and a little rhodonite.	Manganese-bearing bed exposed along 20-ft. trench with 5-ft. race; offset segment of similar zone exposed in shallow pit just southeast. (Engel, 1959, p. 125).
	<i>Lucky Day</i> <i>Lucky Lay</i>				<i>Mica</i> <i>see Pine Knot deposit (C)</i>

Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Agua Caliente Spring				See Palm Springs.

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Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bundy Hot Springs (Bundy's Elsinore Hot Springs)				See Lake Elsinore Hotel

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Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
361	City of Elsinore Wells	SE 1/4 sec. 6, T6S, RAW, SBM.	City of Elsinore, (C. O. Soots, Supt. of Public Works, City Hall, Elsinore) (1955)		Two wells in Elsinore: No. 1 in City Maintenance yard, west of north end of Langstaff Street; No. 2 well 500 ft. southwest of No. 1, between Langstaff and Riley Streets, north of Flint Street. (Engel, 1959, p. 104-105, 139).

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Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
366	Creswell Baths	Cor. secs. 5,6,7,8, T6S, R4W, SBM.	Noritatsu and Mitsuyo Nakai, Spring and Franklin Streets, Elsinore (1955)		(Engel, 1959, p. 105, 139).

Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
367	Desert Hot Springs	E½ sec. 30, T2S, R5E, SBM.	L. W. Coffee, 257 S. Spring St., Los Angeles (1945)	Hot-water wells in the San Andreas fault zone.	Well, sunk in 1940, in the San Andreas fault encountered hot water at a depth of 300 ft. As of 1945 eight wells were developed with a combined capacity of 1500 gals. per minute in temperatures ranging from 112° to 116°. Water used in bath house and swimming pool. (Tucker 1945, p. 175-176).

Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
365	Eden Hot Springs	E 1/4 sec. 23, T3S, R2W, SBM.	M. Greenberg (1945)	Eight small springs in the San Jacinto Fault zone.	Maximum temperature of water about 110°F. Bathhouse and swimming pool. (Waring, 1915, p.37; Tucker 1929, p. 523; 1945, p. 176).

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Elsinore Springs				See Lake Elsinore Hotel and Lakeview Inn hot springs.

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Riverside County

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Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
369	Gilman Hot Springs (Relief Hot Springs, San Jacinto Hot Springs).	SE $\frac{1}{4}$ sec. 9, T4S, R1W, SBM, 3 miles north of San Jacinto on State Highway 79.	Gilman Hot Springs, Mrs. Joe Gilman, proprietor and Wm. Gilman, mgr. (1945)	About 6 springs in the San Jacinto Fault zone near the base of the San Jacinto Mtns.	Hot spring, motor hotel and golf resort. Reported in 1945, as equipped with hotel, cottages and cabins, a large garage. Roman tub baths, mud baths and swimming pool. (Waring, 1915, p. 38; Tucker, 1929, p. 521-523; Sampson, 1931, p. 8, pl. 1; Tucker, 1945, p. 176-177).

Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
376	Glen Ivy Hot Springs	Sec. 10, T5S, R6W, SBM, at base of Santa Ana Mtns. in Temescal Canyon, 10 miles south of Corona.	Axel Springborg and wife (1945)	Small springs having a reported temperature as high as 110°F. issue from the Elsinore fault zone through fractured granitic and porphyritic rocks.	Reported in 1945 to be equipped with a bathhouse, swimming pool and accommodations for guests. (Waring, 1915, p. 42; Tucker, 1929, p. 521; 1945, p. 178).

Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
371	Highland Springs	W $\frac{1}{2}$ sec. 25, T2S, R1W, SBM, about 3 miles northeast of Beaumont.	F. S. and W. W. Hirsh, 646 E. 8th Street, Los Angeles (1945)	Springs issuing from the San Andreas fault zone at the base of the south slope of the San Bernardino Mtns. Water temperature 112°F.	Described in 1945 as comprising a bathhouse and large swimming pool. (Tucker, 1945, p. 178-179).

Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
372	Lake Elsinore Hotel (Bundy's Elsinore Hot Springs, Bundy Hot Springs, Elsinore Springs Elsinore Hot Springs, Wreden, (Wrenden))	Cor. secs. 5,6,7,8, T6S, R4W, SBM (proj.), Main at Franklin Streets, Elsinore.	Dr. Wm. E. Schwartz, 605 North Sierra Drive, Beverly Hills. Leased to George Lewis, Murray Finberg and M. L. Herbener, Box 236, Elsinore (1955).	In 1915, Waring reported: "Many small hot springs formerly issued along the northeast side of Elsinore Lake. In the early nineties, however, a canal was cut and the water of the lake was conducted northward for irrigation, and since that time most of the springs have ceased to flow. Hot sulphurated water is still obtained, however, from shallow wells." (Waring, 1915, p. 42).	A resort comprising a hotel and bathhouse (1945). (Waring, 1915, p. 43, 387; Merrill, 1919, p. 58, 581; Tucker, 1929, p. 523; 1945, p. 181, pl. 35; Larsen 1948, p. 128; 1951, p. 45; Engel, 1959, p. 105, 139).

Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
37	Lakeview Inn Hot Springs (Elsinore Springs, Elsinore Hot Spring)	NE $\frac{1}{4}$ sec. 7, T6S, R4W, SBM (proj.), Graham at Riley Streets, Elsinore.			(Waring, 1915, p. 42-43, 387; Merrill, 1919, p. 580; Tucker, 1929, p. 521-523; 1945, p. 179, pl. 35; Engel, 1959, p. 106, 140).

Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
374	Murrieta Hot Springs	SW $\frac{1}{4}$ sec. 13, SE $\frac{1}{4}$ sec. 14 (proj.), T7S, R3W, SBM, on Webster Avenue about 4 miles east of Murrieta.	Guenther's Murrieta Hot Springs, Murrieta Hot Springs Road	Hot springs issuing from the Elsinore fault zone at base of a gravel bluff. Three springs with a maximum temperature of about 136°.	Hotel, bath-house, cottages and bungalows and landing field for aircraft. (Waring, 1915, p. 44; Tucker, 1929, p. 523; 1945, p. 179-180, pl. 35).

Mineral Spr

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES												
375	Nichols Warm Springs	SE $\frac{1}{4}$, sec. 36, T6S, R21E, SBM, 7 $\frac{1}{2}$ miles west of Blythe on U.S. 60-70.	Nicholls Warm Springs, A. E. Nicholls, President.	Undisturbed alluvial deposits underlying the Palo Verde Mesa.	A cased, 14-inch well, 638 feet deep drilled in May, 1946. Well does not reach bed rock. Static water level was 138 feet. Temperature of water coming out of well 92°. Average analysis <table><tr><td>Total solids</td><td>-----</td><td>ppm 1811.6</td></tr><tr><td>Total Chloride (NaCl)</td><td>-----</td><td>852.2</td></tr><tr><td>Total Sulphate (Na₂SO₄)</td><td>----</td><td>810.5</td></tr><tr><td>Total Alkalinity (CaCO₃)</td><td>---</td><td>111.0</td></tr></table>	Total solids	-----	ppm 1811.6	Total Chloride (NaCl)	-----	852.2	Total Sulphate (Na ₂ SO ₄)	----	810.5	Total Alkalinity (CaCO ₃)	---	111.0
Total solids	-----	ppm 1811.6															
Total Chloride (NaCl)	-----	852.2															
Total Sulphate (Na ₂ SO ₄)	----	810.5															
Total Alkalinity (CaCO ₃)	---	111.0															

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Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
376	Palm Springs	SW Cor. sec. 14, T4S, R4E, SBM, at the corner of Indian Avenue and Taquitz Drive in the city of Palm Springs.	Undetermined	Probably issues from a fault along the base of the mountains.	(Waring, 1915, p. 338; Merrill, 1919, p. 581; Tucker, 1929, p. 523; Sampson, 1931, p. 9, pl. 1; Tucker, 1945, p. 180, pl. 35).

Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Relief Hot Springs				See Gilman Hot Springs.

Mineral Springs
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	San Jacinto Hot Springs				See Gilman Hot Springs.

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Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
377	Soboba Hot Springs	NW 1/4 sec. 30, T4S, R1E, SBM, near Highway 79 about 1 mile northeast of San Jacinto	John G. Althouse, San Jacinto	Six springs issue from the San Jacinto fault. Water temperature ranged from 70° to 118° F. in 1945 (Tucker, p. 180).	Equipped with bath house, separate dwellings, and a swimming pool (1945). (Waring, 1915, p. 39; Tucker, 1929, p. 23; Sampson, 1931, p. 10, pl. 1; Tucker, 1945, p. 180-181).

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Mineral Springs

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Wreden (Wrenden)				See Lake Elsinore Hotel.

Radioactive Deposits

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Aurora No. 1 (mine)	Sec. 26, T6S, R14E, (proj.), SBM.	Tyler Bennett and A. H. Hummel, N. Hollywood (1956)	Unidentified radioactive mineral in copper-stained quartz vein in granite.	May be an old gold prospect. (Walker, 1956, p. 12,26).

Radioactive Deposits
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Big Cat	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 17, T7S, R4E, SBM. 4 $\frac{1}{2}$ miles east of Anza.	J. W. and R. F. Barnes 230 E. Bennett St., Compton (1962)	Sheared and faulted granitic rock in the San Jacinto Fault trace zone .	Property located by this owner May 6, 1957. Developed by single, 20-foot shaft. Anomalous radioactivity, possibly due to radon gas, reported by owner, to be con- fined to shaft. No uranium mineral yet identified (1962).

Radioactive Deposits

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Northeast No. 1 claim	E 1/4 sec. 19, T6S, R21E, SBM, about 2 miles north of U.S. 66-70 and 12 miles west of Blythe on the south slope of the McCoy Mtns.	Joseph and Charles Safrnek, 4219 Lennox Blvd., Lennox	Property lies on east slope of narrow, north-northwest-trending ridge of sheared, metasedimentary rocks. Secondary, yellow, radioactive mineral resembling carnotite unevenly distributed along shear zones in which it has impregnated porous material and formed thin crusts and fissure fillings. Deposit exposed in area several hundred feet long and about 100 feet wide. Full extent not determined.	Radioactive area opened by several bulldozer cuts (Butler, 1962).

Radioactive Deposits

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ironwood No. 1 Prospect	NW $\frac{1}{4}$ sec. 20, T3S, R23E, (proj.), SBM, about 20 miles north of Blythe and 3 miles west of Quien Sabe Point.	Undetermined	Fine to-medium-grained hornblend granite cut by thin pegmatite dikes. No unusual mineralization or radioactivity found.	Located in 1956 by Guy Waite and Cyrus H. Ferguson, Box 29, Parker Star Rt., Blythe. Development comprises a 9-foot burrow in east bank of wash and road work.

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
452	Berdoo Adit Aggregate	SW $\frac{1}{4}$ sec. 10, T4S, R8E, SBM, in Berdoo Canyon $3\frac{1}{2}$ miles northeast of the intersection of Berdoo Canyon and Dillon Road.	Metropolitan Water District of Southern California, 306 West Third St., Los Angeles	Terrace deposits and/or older alluvium along north side of Berdoo Canyon. Material semi-consolidated, massive, poorly sorted sand, gravel, and boulder conglomerate. Deposits about 3 miles long and average of a quarter of a mile in width. Thickness undetermined.	Sand and gravel used in concrete aggregate taken from deposit during construction of Colorado River Aqueduct, 1932-41. Since inactive. Open pits and cuts.

Sand and gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
45	Corona Rock Company	W $\frac{1}{2}$ sec. 32, T3S, R6W, SBM, northwest end of Temescal Wash, 2 miles south-east of Corona, along the east side of the city dump.	Riverside County Flood Control District (1957).	Quaternary alluvium in Temescal Wash; dirty, silty sand with sparse gravel.	About 1937, a small sand and gravel plant known as the Corona Rock Company was erected and operated by Bill Flynn. Dismantled after several years operation. Several small, shallow pits 10-15 feet deep.

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
454	Desert Hot Springs Ready Mix, Inc. (deposit)	SE $\frac{1}{4}$ sec. 13, T2S, R4E, SBM, about 1 $\frac{1}{2}$ miles NW. of Desert Hot Springs	Desert Hot Springs Ready Mix, Inc. Box 286, Desert Hot Springs	Dry wash extends south for about $\frac{1}{2}$ mile from head of canyon. Width ranges from 100-300; up to 50 deep on bed rock. About 70 percent gravel, interstratified layers of sand and gravel up to 1' thick. No overburden or replenishment. Few percent plus 4" gravel. Occasional 2' boulders.	Excavated with dragline scraper and bulldozer to depths of about 50'. Feed empties over primary jaw which crushes plus 4" gravel. From jaw, feed conveyed to trommel screen from which plus 1 $\frac{1}{2}$ " goes to secondary jaw crusher. Wash over standard vibrating screens, twin sand drag. Capacity 60 tons/hr. concrete sand and gravel.

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
455	Fan Hill Canyon deposit	SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20, T3S, R7E, SBM, south edge of Little San Bernardino Mts., 9 miles northeast of Thousand Palms, at west margin of Fan Hill Canyon.	Undetermined	Quaternary alluvium, mostly a sandy, pebble and cobble conglomerate with few boulders. Clasts of metamorphic and granitic rock found in Little San Bernardino Mts.	Probably used in construction of Colorado River aqueduct, 1932-41. Roughly circular pit 400 feet in diameter and 10 to 25 feet deep.

Sand and gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
456	Fargo Canyon Talus (deposit)	Sec. 10, T5S, R8E, SBM, north side of Fargo Canyon Road, 4½ miles northeast of Indio.	Undetermined.	Quaternary alluvial fan. Sandy conglomerate with cobbles and boulders of granitic and metamorphic rocks.	Material tested for all American Canal in 1949 by U.S. Bureau of Reclamation (Report No. C-440). The sample submitted contained a 1½ inch maximum size aggregate and is suitable for use as concrete aggregate, provided the sand is washed to remove silt and an air-entraining agent used in the concrete. No report of use in Government construction. Small pit 150 feet long, 50 feet wide and 20 feet deep. (Dickey and Porter, 1952, p. 9).

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Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
457	Flat Top Mountain Deposit	SW $\frac{1}{4}$ sec. 33, T3S, R5E, SBM, southeast end of Indio Hills 5 miles northwest of Thousand Palms on the south side of Flat Top Mountain.	Undetermined	Dune sand.	Shallow pit on hillslope, about 500 feet. wide and 750 feet long. Probably used in local highway construction.

Sand and gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
457	Hicks-Allred Indio Hills (deposit)	SW $\frac{1}{4}$ sec. 5, T4S, R6E, SBM. Approx. 2 $\frac{1}{2}$ miles north of Thousand Palms.	Hicks-Allred, 36711 Cathedral Canyon Drive, Cathedral City	(See Yaeger)	Excavate with tractor bull-dozer that pushes material to plant. Crush over-size in two jaw crushers. Wash over standard vibratory screens, sand rake. Capacity 130 tons/hr. Products - concrete sand and gravel.

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
459	Industrial Asphalt (Kuster and Waterbury, Transit Mixed Concrete Co.) Corona plant	SE $\frac{1}{4}$ sec. 30, west margin SW $\frac{1}{4}$ sec. 29, (proj.), T3S, R6W, SBM. At Porphyry station, 1 mile east of Corona in lower Temescal Wash.	Industrial Asphalt of California, Inc., 1027 Quarry, Corona (main office, Santa Fe Springs). (1963)	Quaternary stream deposit of silty sand and gravel.	Medium sized plant for concrete sand and gravel operated for many years by Kuster and Waterbury before 1942; from 1942 to the late 1950's by Transit Mixed Concrete Co., who built a new small plant. The most recent operator was Industrial Asphalt. Plant closed down in 1961, apparently because economic depth limit of deposit was reached. Most of the mining was from 2 adjacent pits east of the plant; one pit is about 1,000 ft. by 750ft. and 40 ft. deep; the other pit is about 750 ft. by 500 ft. and 30 ft. deep. Total production undetermined, probably a few hundreds of thousand of tons of washed sand and gravel. (Gray, 1957, p. 96, 119).

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Kuster and Waterbury				See: Industrial Asphalt, Corona plant.

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Sand and gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
46C	Massey Indian Ave. (deposit)	W $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 23, T3S, R4E, SBM on Indian Ave. 3 miles south of Garnet	Massey Sand and Rock Co., 43-850 Monroe St., Indio	Whitewater wash. Interbedded gravelly layers up to 1', and sand layers from 1-3' thick. Deposit at least 50' deep, extends north for several miles from intersection with U.S. 60 and to the east of its confluence with San Gorgonio River, for about 5 miles. Width of deposit ranges from 0.25 mile at head to about 1.0 mile south of Garnet. No overburden. Slight replenishment. Abundant cobbles and boulders up to 3'; 18" max. size gravel near Whitewater diminishes to 4" max. near Garnet where few percent plus 4" gravel and occasional 3' boulders present. Gravel content 65 percent near Whitewater diminishes to 25 percent near Garnet.	Excavate from pit approx. 1000' in diameter to depths of 50' with bulldozer (which pushes material to a conveyor). Convey about 300' to plant. Scalp oversize off top deck double vibrating screen. Sand goes to Wemco sandscrew. Crush oversize in two jaw crushers. Wash over standard vibrating screens, sand drag. Capacity of 2200 tons/day. Material used for concrete and bituminous sand and gravel, plaster sand.

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
461	Massey Indio Hills deposit	NE $\frac{1}{4}$ sec. 3, T5S, R7E, SBM, about 3 miles north of Indio	Massey Sand and Rock Co., P.O. Box 487, Indio	Alluvial fan deposit on southwest flanks of Indio Hills. Developed area covers about $\frac{1}{2}$ sq. mile. Deposit contains about 35 percent gravel. At least 60' deep. Inter- bedded sand and conglomerate layers range from 1 to 3' in thickness. No overburden or replenishment. Abundant plus 3" gravel, av. max. size 18"; some 2' boulders. Max. size diminishes to west and north.	Excavate with shovel from pit with work- ing face about 30' high. Haul about 2000' in end dump trucks to plant. Dis- charge over grizzly into primary jaw crusher. Crush plus 3" in secondary cone. Wash over standard vibrating screens; sand wheel. Bucket elevator and conveyors load bunkers. Capacity 2500 tons/9 hrs. Products - concrete and bituminous sand and gravel, road base, plaster sand. Have hot mix on premises. Truck to ready mix plant in Indio.

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Sand and gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
462	Massey Whitewater deposit	NE 1/4 sec. 11, T3S, R3E, SBM, 1/4 mile north of Whitewater	Massey Sand and Rock Co., 43-850 Monroe St., Indio	See Massey Indian Ave. deposit	Excavate with shovel from pit in dry wash. Haul by truck to nearby plant. Depth of deposit 50'. Abundant boulders. Pit run dumped over grizzly into reciprocating feeder. Crush in primary and secondary jaw, tertiary cone and roll crushers. Dry screen over standard vibrating screens. Capacity of 450 tons/hr. Concrete and bituminous sand and gravel, road base.

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
463	Mission Creek deposit	S½ sec. 16, T2S, R4E, SBM, 4 miles northwest of Desert Hot Springs in Mission Creek just east of Twentynine Palms highway.	Undetermined	Alluvium of unknown depth covers large area. Apparently material in Mission Creek-Dry Morongo Wash area has more favorable sand-gravel reject fines ratio than does the material adjacent to the wash.	The deposit was opened in 1957 and operated from June 1957, to February 1958 by the Gunther-Shirley-Lane Co. Aggregate for concrete was supplied to the nearby semi-portable plant of the American Pipe Construction Co. where precast pipe was made for use in the Colorado River Aqueduct expansion in the area. Inactive since 1958. Large open-pit quarries. Semiportable plant produced washed sand and gravel. International TD24 Tractor dozer fed hopper directly from pits. (Proctor, 1958, p. 143).

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Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
461	Murrieta Borrow Pit	SW corner of Webster and Jefferson Aves. in the Murrieta portion of the Temecula Ranch, one mile southeast of Murrieta	Riverside County	Coarse fanglomerate with interbedded sand and silt (Quaternary Pauba Formation of Mann, 1955, plate 1).	Used as a source of road metal by Riverside County since 1950. Mine intermittently from an open pit.

Corona South fork 11/2 mi S6

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
465	Pomona Ready Mix Concrete	NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 5, T4S, R6W, SBM. East side of Temescal Wash, 3 miles southeast of Corona.	Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul, Minn. owns a large tract of land. Pomona Ready Mix Concrete, Upland, owns and operates the plant.	Recent stream-deposited sand in Temescal Wash.	Ready Mix concrete batch plant erected early in 1963. Plant utilizes quarry waste from Temescal Rock Quarry for concrete gravel and sand from Temescal Wash adjacent to the plant. Sand is mined by front end tractor loader from small pit about 50 feet by 100 feet and 10 feet deep.

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Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
466	Riverside County Gravel Pit	E $\frac{1}{2}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 29, T6S, R7E, SBM.	Riverside County	Quaternary alluvial fan deposit of sand and gravel.	Owned by Riverside County since 1947. Development undetermined.

Rock Products
Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
467	Riverside County Gravel Pit	SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 20, T7S, R3E, SBM. west side of Bahrman Rd. $\frac{1}{4}$ mile south of Coahuilla Rd.	Riverside County	Quaternary stream deposit.	Owned by Riverside County since 1946. Development undetermined, probably a local source of fill and road metal.

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Riverside Sand Co.
11. 17

Rock Products
Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
468	Riverside Sand Company	NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T2S, R6W, SBM. North bank of Santa Ana River $\frac{1}{4}$ mile east of Van Buren Blvd. (Pedley Road).	Riverside Sand Company 7626 Arlington Ave Riverside	Quaternary sand deposit along margin of Santa Ana River channel. Deposit contains minor proportion of gravel with a few cobbles.	Circular pit about 200 feet in diameter filled to surface with water. Pit 35 feet deep. Plant erected in 1960 and placed in operation September 1962. Mine with 2 cu. yd. slack line drag which feeds a bin. Raw material goes by belt conveyor to shaker screens, washing; rock is scalped off and sent to one pile, coarse sand to another pile, finer sand to a third pile. Silt and mud fines are rejected by a twin sand drag and returned to river bank area. Plant capacity is 65 tons per hour; 100 tons per hour with a larger drag. Products include: Plaster sand, concrete sand, 3/4-inch rock, and pea gravel.

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
469	San Gorgonio Rock Products deposit	NW 1/4 sec. 3, T3S, R1E, SBM, about 1/2 mile N. of Banning.	San Gorgonio Rock Products, P.O. Box 1414, Banning	Dry wash deposit extends from north of Banning to confluence with White-water River, a distance of about 15 miles. Width of deposit ranges from 250' at head to 1000' farther east; at least 60' deep. Slight overburden. No replenishment. Average maximum gravel 6", with boulders up to 2' present. About 65 percent gravel content. Abundant plus 1 1/2" gravel.	Excavate from pit 1000' long x 300' wide x 60' deep, with shovel. Haul in end dump truck several hundred feet to plant. Work in 25' benches. Crush oversize in primary jaw and secondary cone crushers. Wash over standard vibrating screens; sand screw and sand drag. Capacity 250 tons/hr. Concrete and bituminous sand and gravel, road base, plaster sand.

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
470	Service Rock (The Service Gravel) Company	SE $\frac{1}{4}$ sec. 3, E $\frac{1}{4}$ sec. 10 (proj.) T2S, R5W, SBM. West side of Santa Ana River, 2 $\frac{1}{4}$ miles northwest of Riverside.	Undetermined	River terrace deposit along west side of Santa Ana River. Overburden in the area mined averaged about 5 feet of silt and soil; sand and gravel layer was 15-20 feet thick and bottomed in a silt layer which is underlain by coarse, buff, sand with no gravel. Deposit averaged about 60 percent sand and 10 percent silt waste. Most of the gravel was less than 2-inch with a few cobbles. This material was tested by the U.S. Bureau of Reclamation in 1945 (Report No. C-275) and found to be suitable for concrete aggregate.	Area totaling about a quarter section was mined from some 8 pits in secs. 3 and 10 from 1920 to 1955. Early operations started before 1920 in the SE $\frac{1}{4}$ sec. 10 where The Service Gravel Co. erected its first plant. During the late 1920's and early 1930's the plant and several pits were in the SE $\frac{1}{4}$ sec. 3. A third and final plant was completed in 1936 at C Street and Crestmore Road and was active until 1955 when the available gravel deposits were worked out. In 1941 the operation became the Service Rock Co. From 1936 to 1955 mining was from several pits in the E $\frac{1}{4}$ sec. 10. The plant produced 85 tons per hour of washed sand and gravel products including plaster, concrete, and engine sand; and gravel up to 1 $\frac{1}{2}$ inch. Total production from the area is unknown, but probably was about 2,000,000 tons. (Dickey and Porter, 1952, p. 3).

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Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
171	Shepwells Big Maria (deposit)	Pit: SE $\frac{1}{4}$ sec. 27, T5S, R23E, SBM, about 6 miles north of Blythe. Road base from County pit SE $\frac{1}{4}$ sec. 25, T5S, R22E, SBM. Plant on Riverside Ave. in Blythe.	Shepwells Inc., P.O. Box 87, Blythe	Dry wash deposit extends for about 1 mile north of intersection with Highway 95. About 500' wide and at least 50' deep. No overburden or replenishment. Max. size gravel 8", some 12' boulders. About 60 percent gravel content.	Excavate from pit approx. 300' wide x 250' long x 50' deep. Haul about 6 miles to plant. Crush in primary jaw and secondary cone crusher; wash over vibrating screens. Capacity 300 yds/day. Products - concrete and bituminous sand and gravel.

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
442	Thermal Canyon Wash (deposit)	SE $\frac{1}{4}$ sec. 18, T6S, R9E, SBM, west edge of Mecca Hills at the end of Ave. 56, 3 $\frac{1}{2}$ miles east of Thermal.	Undetermined. Co-Val Concrete Pipe Co., Coachella operator (?) (1959)	Alluvium, mostly sandy, pebble and cobble conglomerate with few boulders. Clasts of metamorphic and granitic rocks.	Sample of sand and gravel from sec. 18, 2$\frac{1}{2}$ miles east of Thermal tested for All American Canal in 1949 (Report No. C-440) contained 1$\frac{1}{2}$-inch maximum size aggregate; is of inferior quality but suitable for use in mild climate if sand washed free of silt and air entraining agent used in mix. Pit 300 feet long, 50 to 150 feet wide and 25 feet deep. Largely dismantled plant (crusher, screens, loading bin) apparently produced unwashed aggregate. No report of use in government construction. (Dickey and Porter, 1952, p. 9).

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Transit Mixed Concrete Company Corona plant				See: Industrial Asphalt, Corona plant.

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
473	Triangle Rock Products, Inc. Mira Loma Plant	NE $\frac{1}{4}$ sec. 6, T2S, R6W, SBM, in lower Day Creek at Mira Loma. 10 miles west of Riverside at Wineville Road and U.S. Highway 60.	Triangle Rock Products, Inc. 2400 West Highland P.O. Box 2083 San Bernardino	Dry wash and/or old alluvial fan from south flank of San Gabriel Mountains. Deposit opened over an area about 2,000 feet long and 1,000 feet wide. Mined to depths of 40-50 feet where deposit bottoms in silt. Ten to 20 feet reddish-brown dirty silt overburden. No replenishment. Maximum size of gravel 6" to 8" with very few up to 1 foot, mostly 3" to 4". About 50 percent gravel. Pit shows mostly well mixed sand and gravel; in places layers of sand 1 to 1 $\frac{1}{2}$ feet thick and gravel 2 to 4 feet thick. Layers horizontal, material soft, nonindurated. Gravel mostly mica schist and granitic debris.	Excavate with Link Belt 1-yd. dipper shovel from pit with working face about 40' high. Haul about 2,000' to plant in KW 17-ton end dump trucks. Discharge over grizzly into primary jaw crusher. Crush oversize in secondary Symons Cone and Traylor 3-foot cone. Discharge to 5' x 10' inclined shaker screen. Wash over standard vibrating screens. Conveyors load bunkers. Pit area covers about 60 acres. Products include concrete and plaster sand, unwashed sand, and concrete gravel up to 2 $\frac{1}{2}$ inches. Capacity 300 tons per hour.

Rock Products

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
474	Pit (name undetermined)	NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 8, T3S, R2W, SBM. Dry wash north side of State Highway 79, about 13 miles northwest of San Jacinto.	Undetermined	Quaternary stream and/or alluvial fan with some gravel. Most clasts are cobbles or smaller of granitic rock, some metamorphic and volcanic clasts.	Utilized during World War II as a source of sub-base and/or aggregate for construction at March Air Force Base. Large open pit, not well defined but about 1,000 ft. long, 500 ft. wide, and 50 ft. deep. Apparently long idle.

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
475	Pit (name undetermined	SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 8, T3S, R2W, SBM. Edge of dry wash, south side of State Highway 79, about 13 miles northwest of San Jacinto.	Undetermined	Quaternary stream and/or alluvial fan deposit of sand with some gravel. Most clasts are cobbles or smaller of granitic rock, some metamorphic and volcanic clasts.	Pit about 300 ft. long, 150 ft. wide, 25 ft. deep. Material used as a source of sub-base and/or aggregate for construction at March Air Force Base about 1953; apparently since idle.

Rock Products

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
476	Pit (name undetermined	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14, T4S, R1W, SBM. 2 $\frac{1}{4}$ miles due north of San Jacinto, on the northeast side of State Highway 79.	Undetermined	Quaternary alluvial fan deposit. Dirty gravel, mixed with consider- able decomposed granitic material.	Circular pit 150 ft. diameter, 40 ft. maximum depth. Apparently a local source of sand and gravel for fill or highway construction. Pit opened before 1953, idle in 1963.

Sand and gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
477	<i>Undetermined</i> Unidentified) (gravel-pit)	SW $\frac{1}{4}$ sec. 32, T4S, R8E, SBM, in the valley between the Indio Hills and Little San Bernardino Mts., east of Dillon Road 1 $\frac{3}{4}$ miles south of the Berdoo Canyon road intersection.	Undetermined	Alluvial fan material. A "dirty" unsorted, cobble, sand, and boulder conglomeration with little gravel.	Open-pit about 350 feet x 100 feet x 25 feet deep.

Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
478	Unidentified) (gravel pit)	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, T4S, R6E, SBM, south margin of the Indio Hills, 2 miles north of Thousand Palms	Undetermined	Sandy conglomerate	Pit about 200 feet x 100 feet x 25 feet deep.

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
479	Unidentified Unidentified deposit	SE 1/4 sec. 28, T4S, R6W, SBM, Temescal Valley, 7 miles southeast of Corona, in lower Brown Canyon.	Mrs. R. Boyd & W. Heinlein, 3265 Floresto Ave., Los Angeles own patented ranch land (1957); 50 acres leased to Temescal Rock Products Company, P.O. Box 364, Corona, (1957)	Stream gravels said to be 80 percent rock with average thickness of 40 feet.	Undeveloped (Gray, 1961, p. 119).

Rock Products
Sand and Gravel
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
480	Valley Rock and Sand Corp.	Plant and deposit: E $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 22, T3S, R2W, SBM. At Jack-rabbit trail and State Highway 79, about 10 miles north-west of San Jacinto.	Valley Rock and Sand Corp., 24161 State St. (P.O. Box 926) San Jacinto	Quaternary stream deposit. Narrow dry wash, maximum width 750 ft., extends for several miles along the west side of Jackrabbit Trail. Deposit opened over an area about 1,000 ft. long and 400 ft. wide. Mined to depths of 10 to 40 ft. where deposit bottoms in silt or in places schist. No replenishment. Sandy silt overburden 3-4 ft. Horizontal layers of non indurated rather well mixed sand and gravel. Very few clasts more than 1-ft. diameter, most are cobbles or smaller. About 75% sand, 5% rock, 20% silt. Most clasts are hard granitic rock, some metamorphic and volcanic clasts.	Plant in operation since 1944. Excavate with northwest 3/4-yd. dipper shovel from pit with working face about 40 ft. high. Haul about 1,500 ft. to plant in 10-yd. Reo end-dump trucks. Discharge over grizzly into hopper which feeds a 3-deck vibrating screen. Oversize (+3/4-in.) goes to jaw crusher. Crusher product returns to the 3-deck screen. Material is washed on 2 bottom decks by water spray bars. Sand size from bottom screen goes through a drag washer, then a wheel washer, and to stockpile. Rock from upper screens goes to loading bins for storage. Products include concrete and plaster sand, concrete gravel and pea rock (3/8-in. to 3/4-in.), and road gravel (1/8-in. to 3/8-in.). Capacity is 150 tons per hour, operate at about 80 tons per hour.

Sand and gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
481	Valley Transit Cement Co. deposit	^W ² NE 1/4 sec. 30, T8S, R9E, SBM, abbut 2 miles south of Oasis	Valley Transit Cement Co., Inc., P.O. Box 1489, El Centro	Broad alluvial plain on flanks of Santa Rosa Mts. encompasses several square miles. Developed area covers several acres. Sparse sand interbeds. About 65 percent gravel. Material coarser at depth. Gravel reported present to depths of about 75'. Water table at 70'. No overburden. No replenishment. Dry, abundant plus 3" gravel, 10", some 2' boulders present.	Excavate and feed plant with bulldozer tractor, work to about 10' depth. Pit run goes to primary jaw crusher, wash over standard vibrating screens. Plus 3" crushed in secondary cone. Wash sand in screw type classifier. Capacity 140 tons/hr. Concrete sand and gravel. Have batch plant and own ready mix trucks.

Sand and Gravel

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
482	Yeager Indio Hills deposit	SW $\frac{1}{4}$ sec. 5, T4S, R6E, SBM, approx. 2 $\frac{1}{2}$ miles north of Thousand Palms.	E. L. Yeager Co., P.O. Box 87, Riverside.	Deposit at head of alluvial fan in dry wash. Approx. 300' wide x 1000' long x at least 35' deep. Abundant sand -- approx. 35-50 percent of deposit. No overburden or replenishment. Average max. size gravel 9", abundant plus 3", occasional 3' boulders present.	Excavate with tractor that pushes material to plant. Crush in primary jaw and secondary cone crushers; standard vibrating screens. Capacity 200 tons/hr. Bituminous sand and gravel produced.

Riverside Molding Sand
No. 13

Rock Products
Specialty (Foundry) Sand
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
486	Jurupa (Riverside) Molding Sand Deposit	SW $\frac{1}{4}$ sec. 29, T2S, R5W, SBM. Along the south bank of Santa Ana River at the north end of Fremont St., $3\frac{1}{2}$ miles southwest of Riverside.	Undetermined	Sand occurs as a reddish layer on the surface of a Quaternary terrace. According to Wright (1948, p. 57) at the Jurupa deposit this layer is 6 to 8 feet thick and is underlain in part by light-gray silty sediments. Granitic rock (Bonsall Tonalite?) is reported to occur beneath part of the excavation. Overburden consists of clay-poor sand that averages 1 foot in thickness. The molding-sand layer is unstratified, poorly consolidated, and contains many minute sponge-like pores. Small igneous pebbles are sparsely scattered throughout the layer. Within the limits of the excavation, the sand is both vertically and laterally uniform. Similar material occurs as a thin, residual mantle on nearby granitic hills.	Riverside molding sand, also known as "V3" or "Pedley sand" was mined intermittently west of Riverside in the vicinity of the Santa Ana River channel from the 1920's until the 1950's. The Jurupa deposit, on the south bank of the river, was opened in 1923 by Harry E. Blood who shipped 6-8 cars per month. During the 1940's this deposit was operated by Miller Brothers, Huntington Park. An excavation on the north bank was operated by Westlake and Sons, Los Angeles, at some period prior to 1947. Riverside sand was found most suitable for light gray iron, brass, and bronze castings. A smooth finish was produced. When the area was visited in January 1963, the sites of former excavations could not be definitely determined. Apparently molding sand has not been mined in this area for many years. (Tucker, 1924, p. 46; Wright, 1948, p. 57-58). See Riverside Molding Sand

Quaternary - T2S

Wright

Rock Product

Broken and Crushed Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
394	Bernasconi Quarry	SW 1/4 sec. 11, T4S, R3W, SBM. In the Bernasconi Hills at the west side of Bernasconi Pass, south side of Martin Street.	James Minor, San Jacinto (1961)	Light to very dark gray, coarse-grained granodiorite (mapped as Granodiorite west of Lakeview by Larsen, 1951, plate 1). Contains abundant dark, flat, elongated, oriented inclusions concentrated in parallel streaks. Rock in quarry face is well fractured. Overburden ranges from 0 to 5 feet of decomposed granodiorite.	Quarry opened in July, 1961, to furnish rubble and riprap for the San Jacinto River levee project. Operated by Hugh Seeger, Whittier. Quarry is sidehill cut on one main bench level about 300 feet long, 175 feet wide with face 40 feet high. Rock was crushed and sized at the quarry for the levee project which was completed late in 1961. Quarry apparently has since been idle. A considerable tonnage of large boulders remain below the quarry bench, where they were apparently pushed aside as waste.
	<i>Blue Diamond Minerals Co.</i>				<i>See Technical Report on Riprap, Y. S. 1961</i>

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Rock Products

Broken and Crushed Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
292	Box Springs Quarry	SW 1/4 sec. 33, T2S, R4W, SBM. Along the east side of the railroad, in Box Springs Canyon 1/2 mile northwest of Box Springs.	Santa Fe Railway System, 121 East Sixth St., Los Angeles 14.	Light to dark gray, medium grained, quartz diorite (Cretaceous Bonsall Tonalite). Bouldery surface, no overburden. Rock is somewhat fractured.	Santa Fe Railway has intermittently quarried rock for use as rubble and track ballast since at least 1940. Quarry is side-hill cut on one level along the track, about 1,250 ft. long and 50 to 100 ft. wide. Face is 30 to 60 ft. high. Idle in July 1963.

Rock Product.

Broken and Crushed Stone

Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
397	Casa Blanca Quarries	S $\frac{1}{2}$ sec. 10, T3S, R5W, SBM. 1 mile southeast of Casa Blanca. Two quarries, the larger on the south edge of Quarry Hill on the northwest corner of Madison St. and Lenox Ave.; the other quarry is about $\frac{1}{3}$ mile to the south, northeast of the intersection of Dufferin Ave. and Grace St.	Undetermined	Dark gray, medium grained granitic rock (Cretaceous Bonsall Tonalite). Contains dark inclusions ranging from a fraction of an inch to several inches in diameter. Rock is jointed and breaks to regular even surfaces along lines of fracture.	In 1905 the quarries were owned by the Southern Pacific Railroad Co., and operated by the California Construction Co. who were shipping stone for use as rubble in construction of the San Pedro breakwater. In 1905 the north quarry had an opening about 100 feet square with a face of from 50 to 60 feet; the south quarry was 100 feet long, 30 feet wide, with a face of from 30 to 40 feet. By 1914 these quarries were reported as long idle. In January 1963, both quarries were being utilized as dump sites; their dimensions appeared to have been only slightly enlarged from those of 1905. (Aubury, 1906, p. 44-46; Merrill, 1917 [1919] p. 584).

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Broken and crushed stone

Riverside

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Christopher Mines, Inc. claim)	SW $\frac{1}{4}$ sec. 36, T2S, R3E, SBM, between Super Creek mine and Painted Hill Quarry (see herein).	Last reported: Christopher Mines, Inc. c/o E. O. McFall, Box 341, Glendale	Like Painted Hill Quarry (see herein).	(Proctor, ¹⁷ unpublished thesis). ^

ROCK PRODUCTS
STONE, BROKEN CRUSHED
RIVERSIDE COUNTY

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Desert Sunset	NW 1/4 NE 1/4, Sec. 21, T3S, R21E, SBW, on a small foothill at the north-west end of the Big Maria Mountains.	U. S. Minerals Development Corp.	Quartzite in a formation of undescribed extent, probably the Paleozoic (?) Maria formation widely exposed in the area. Quarried rock cleaves into tabular fragments colored by iron and manganese oxide, stains, and coatings.	Quartzite sold under the name of "rosado stone" for decorative stone work (published decision; U.S. Department of the Interior, Bureau of Land Management, July 22, 1963).
	<i>New Grant</i>				<i>See S. T. M. Spec. (t)</i>

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Rock Products

Broken and Crushed Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES												
400	Hole Ranch Quarry	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 22 (proj.) T3S, R6W, SBM. Low isolated hill just north of the west end of Buchanan St., 1 $\frac{1}{2}$ miles southwest of La Sierra.	Undetermined	Light gray, medium grained granodiorite (Cretaceous) Mt. Hole Granodiorite). Surface deeply weathered with large hard boulders remaining.	Two small sidehill quarries. The larger, quarry, on the east side of the hill, is about 50 feet by 25 feet and 25 feet deep; the other quarry, on the west side of the hill, is about 40 feet in diameter and 15 feet deep. Tests on two samples from the Hole Ranch quarry made about 1939 by the District Laboratory, Corps of Engineers, U.S. Army, showed the following: <table><tr><td></td><td colspan="3">L.A. Rattler, % loss at 500 revs.</td></tr><tr><td>Specific Gravity</td><td>Average</td><td>maximum</td><td>minimum</td></tr><tr><td>2.71</td><td>35.5</td><td>38.0</td><td>33.0</td></tr></table>		L.A. Rattler, % loss at 500 revs.			Specific Gravity	Average	maximum	minimum	2.71	35.5	38.0	33.0
	L.A. Rattler, % loss at 500 revs.																
Specific Gravity	Average	maximum	minimum														
2.71	35.5	38.0	33.0														

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Rock Products

Broken and Crushed Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
402	Juaro Canyon Quarry <i>Long Green Matich Brothers and Sons Co.</i>	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, T4S, R1E, S8M. West side of upper Juaro Canyon, 1 mile east of Soboba Hot Springs.	Hawley Rock Inc. 5277 North Vincent Ave., Azusa, (P.O. Box 7, Irwin- dale)	Coarse grained, light colored gran- ite. Rock exposed in quarry face is well fractured and apparently has good breakage qualities. No overburden. Mapped by Fraser (1931, plate facing p. 540) as Jurassic(?) granite.	Side-hill quarry on one level about 200 ft. long, 100 ft. wide, face 40 ft. high. Quarry was opened and operated by Hawley Rock Inc. in 1961 to furnish rock for the San Jacinto River levee project. Total production undetermined, probably a few tens of thousands of tons. Idle since late 1961. <i>see storm Sulphide (?)</i> <i>1. Juaro Canyon</i> <i>rock quarry (L.)</i>

Broken and Crushed Stone

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Rock Products

no. 15

Rock Products

Broken and Crushed Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
403	Old City Quarry (Fairmount Hill Quarry, North Hill Quarry).	SW $\frac{1}{4}$ sec. 14 (proj.) T2S, R5W, SBM. South of and above Fairmont Park in a hill area bounded by Locust St. on the east, Redwood Dr. on the west, Houghton Ave. on the south, and Banks St. on the north.	City of Riverside	Dark gray weathered quartz diorite (Cretaceous Bonsall Tonalite?) has intruded a sequence of marble and schist over an area about 1,000 feet long and 300 feet wide. The metamorphic rocks strike nearly east-west and are steeply dipping. The marble beds range from less than 2 feet to about 12 feet in width and the longest exposed strike length of marble is about 220 feet. A number of minerals have been reported from this quarry area (see Murdoch and Webb, 1956).	In 1914 the City of Riverside was operating a crusher on the site to provide crushed stone for macadam and concrete. Apparently both the diorite and metamorphic rocks were utilized. At least 5 separate quarries are identifiable in the area with the largest about 100 feet wide, 150 feet long, and face 50 feet high. Most of the rock mined apparently was quartz diorite but the metamorphic sequence is also present in the quarries. Apparently the limestone was never utilized other than for aggregate. These quarries have been idle for about 50 years, except for furnishing occasional small amounts of decomposed material for local use. (Aubury, 1906, p. 320).

*Broken Rock
Hill*

P. J.

*2. Tonalite (see
note p. 10)
p. 10. Tonalite*

*4. Tonalite
(see p. 10)*

5. Tonalite (see p. 10)

ROCK PRODUCT ^{sf-1.2}
Broken and Crushed rock
^

RIVERSIDE COUNTY

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Super Creek	SW $\frac{1}{4}$ sec. 36, T 2 S, R 3 E, S8M, on the southeast flank of Painted Hill	Reported to be held by a man named Grossman (1958)	Same as Painted Hill Quarry (herein).	Activity confined to assessment work in the form of roads and open cuts (1959). ^{1968, p. 21} (Proctor, unpublished thesis.) ^

Private property
no. 12

Rock Products

Broken and Crushed Stone

Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Quarry (Name) undetermined	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 2, T3S, R6W, SBM. Low hill east of Tyler St., and be- tween Gramercy Pl. and Hedrick Ave.	Undetermined	Blocky, hard, blue gray granitic rock (Cretaceous San Marcos Gabbro?).	Small shallow quarry with a few quarried blocks scattered about the area. Apparently was once a minor source of building stone, but long inactive. In January 1963, the area was almost completely residential.

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Rock Products

Broken and Crushed Stone

Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Quarry (name-undetermined)	NW $\frac{1}{4}$ sec. 3, T2S, R6W, SBM. North edge of the Jurupa Mountains.	Riverside County	Cretaceous Woodson Mountain Grano-diorite. Light gray, hard, fine-grained, inclusion-free grano-diorite.	Apparently quarried on a small scale at some unknown time for building purposes. In 1950 the quarry was about 50 feet long, 20 feet wide, and 15 feet high. Idle in 1950. By 1963 the quarry was nearly filled with debris and was being utilized as a Riverside County disposal area. (Mackevett, 1951, p. 13).

Stone, Metasandstone,
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>undetermined</i> Unidentified quarry	E $\frac{1}{2}$ sec. 14, T5S, R4W, SBM. Low hills about $\frac{1}{4}$ of a mile northeast of San Jacinto River; about 6 miles northeast of Elsinore.	Undetermined		(Engel, 1959, p. 101).

Stone, /Metasandstone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unidentified Road material pit	SE $\frac{1}{4}$ sec. 19, T5S, R4W, SBM, at southern tip of hills 3 miles due north of Elsinore.	Undetermined		Road material pit. (Engel, 1959, p. 102).

Stone, Metasandstone:

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unidentified road material pit	NE $\frac{1}{4}$ sec. 24, T5S, R5W, SBM, south- eastern end of hills about 4 miles northwest of Elsinore.	Undetermined		Road material pit. (Engel, 1959, p. 102).
	Whiterock Granite Schist deposit				<i>Pc Fossiliferous granite (G)</i>

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Rock Products

Stone - Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
412	Arnold Heights Pit	W $\frac{1}{4}$ sec. 27, T3S, R4W, SBM. Low hills about 1 mile west of Alessandro, south of Van Buren Blvd.	U.S. Air Force	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Several pits in this area have been mined by the U.S. Air Force since the 1940's as a source of road metal for March Air Force Base and adjacent installations. Mining has been from an irregular area about 1,000 ft. by 500 ft. with pits from 10 to 20 ft. deep. In 1963 two pits were active. Equipment includes bulldozers, rippers, scrapers, front-end loaders.

Revised List of
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Rock Products

Decomposed Granite

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
413	Brokar Pit	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, T2S, R5W, SBM. Along the east side of a small wash on the east side of 54th Street; south- eastern Pedley Hills south of Limonite Ave.	Cleo E. Brokar 6401 54th Street Riverside	Weathered Cretaceous granitic rock (Bonsall Tonalite).	Irregular pit area about 300 feet long, 100 feet wide, with maximum depth of 40 feet, has been mined from about 6 small pockets at different levels. Soil is loosened and piled by small dozer and ripper equipped Cletrac. Material is loaded by Ford Ferguson front end loader on small dump tracks directly at the face for transport to market. A small, local source of "decomposed granite".

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
414	Coplin Pit	SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 29 (proj.), T3S, R6W, SBM. North-trending low hill north side of Sampson St. and the Santa Fe R.R., 1 3/4 miles east of Corona.	Corona Dee Gee Company, 609 Corona, Corona	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite).	Decomposed granite has been quarried from this area for many years for local use as road metal. In 1963 the Corona Dee Gee Co. was operating a rather large somewhat U-shaped sidehill cut about 1,500 ft. long, 500 ft. wide, with maximum depth of about 50 ft. Mining is done by a Caterpillar D-8 with bulldozer and ripper. Loosened material is pushed into a hopper from which trucks are belt-loaded. Front-end loader is also used. Present mining started in the late 1950's, apparently reactivating an old pit. About 1,000 ft. to the southwest, just north of the railroad, is a small pit, apparently long idle.

Corona Soil prod. map no. 50

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
415	Fontana Paving, Inc.	NE 1/4 sec. 5, T4S, 46W, SBM. East side Temescal Wash, 3 miles southeast of Corona.	Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul, Minn. owns a large tract of land. Fontana Paving, Inc., 8747 Lime St., Fontana owns and operates the plant.	Weathered Cajalco Quartz Monzonite and older alluvium.	Modern plant to make asphalt paving was erected early in 1963 by Fontana Paving. This plant utilizes weathered quartz monzonite and alluvium mined from shallow pits east of the plant, and quarry waste from the Temescal Rock Quarry. The Corona Clay Co. also intermittently mines "decomposed granite" from the same pit area used by Fontana Paving. This material is sold locally for road surfacing.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
416	Nason Street Pit	S $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 3, T3S, R3W, SBM. 3 miles east of Sunnymead at the northeast corner of the intersection of U.S. Highway 60 and Nason Street.	Undetermined	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Irregular area about 1,000 ft. by 500 ft. was mined to depths of 10-15 ft. Irregular hard zones were left as "islands". Pit was operated in 1942 by the Service Rock Company, Riverside. Material was used as sub-base in runway construction and as road metal at March Air Force Base. Production of several tens of thousands of tons. Apparently idle since 1942, and in 1963 construction of the Nason Street Overcrossing on the freeway obliterated most of the pit area.

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
447	Nuevo Road Decomposed Granite quarry	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 24, T4S, R4W, SBM, near the west end of Nuevo Road	Land owner undetermined. Site leased by E. L. Yager Co. (1959)	Deeply weathered ^N Perris Quartz-Diorite ^N (Dudley, 1935, p. 501)	When visited quarry was a bull-dozed area about 500 ft. long and 200 ft. wide. The weathered diorite (DG) was being mixed, at the quarry, as follows: 67 percent DG 33 percent 1 $\frac{1}{2}$ "-3/8" crushed rock and an additional 2 $\frac{1}{2}$ percent cement 8 $\frac{1}{2}$ percent water This mixture was trucked to the nearby construction site of U.S. Highway 395 to be used as "cement treated sub base". The DG was run through 1 $\frac{1}{2}$ screen without crushing. As much as 2,000 tons per day of mixed road base taken from site (see fig. H. 10 (figure) ___/). A

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*Yucca Valley West Quad
No. 41*

Rock Products
Decomposed Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
418	Riley Materials Company	NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T2S, R6W, SBM. North bank of Santa Ana River, east side of Van Buren Blvd. (Pedley Road).	Riley Materials Co. 6740 Doolittle St. Riverside	Light gray, weathered, granitic rock with hard, dark black, inclusions (Cretaceous Bonsall Tonalite).	Mine with small bulldozer from pit 150 feet long, 75-100 feet wide, and face 20 feet high. In addition to decomposed granite this company markets fill sand and silt obtained from the adjacent dry margin of the Santa Ana River.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
419	Riverside County Gravel Pit	SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 2, T4S, R4W, SBM. Low hills $\frac{1}{4}$ mile south of Markham Street and 1 $\frac{1}{4}$ miles west of Highway 395	Riverside County owns 10 acres	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Development not determined.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
120	Riverside County Gravel Pit	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 4, T3S, R6W, SBM. South-east of intersection of Arlington Ave. and 6th Street, 2 miles east of Norco.	Riverside County	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite).	Owned by Riverside County since 1949. Development undetermined.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
421	Riverside County Gravel Pit	W $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, T6S, R2W, SBM. $\frac{1}{4}$ mile west of the intersection of Leon Road and Keller Road.	Riverside County	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite).	Owned by Riverside County since 1941. Development undetermined.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
422	Riverside County Gravel Pit	N $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 26, T5S, R3W, SBM. 3 miles southeast of Romoland, northwest of the intersection of Menifee Road and Simpson Road.	Riverside County	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Owned by Riverside County since 1948. Development undetermined.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
425	Riverside County Gravel Pit	S $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 29, T5S, R3W, SBM. 3 $\frac{1}{2}$ miles southwest of Romoland, $\frac{1}{2}$ mile west of Murrieta Road.	Riverside County	Weathered metamorphic rock (mapped as Triassic Bedford Canyon Form- ation by Larsen, 1951, plate 1).	Owned by Riverside County since 1950. Development undetermined.

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Rock Products
Decomposed Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
424	Riverside County Gravel Pit	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 18, T5S, R3E, SBM.	Riverside County owns about 6 acres	Weathered granitic rock, mapped as Jurassic(?) Granite (Fraser, 1931, plate facing p. 540).	Owned by Riverside County since 1948. Development undetermined.

Rock Products
Decomposed Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
442	Riverside County Gravel Pit	E $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, T5S, R1E, SBM. Southwest inter- section of Pleasant and Harrison Aves.	Riverside County	Weathered granitic rock, mapped as Jurassic(?) granite (Fraser, 1931, plate facing p. 540).	Owned by Riverside County since 1946. Development undetermined, apparently used locally for road metal.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
112C	Riverside County Gravel Pit	E $\frac{1}{2}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 9, T4S, R3W, SBM. Isolated small hill south of Martin Street at south end of Evans Road.	Riverside County	Weathered granitic rock (mapped as ' Granodiorite West of Lakeview' by Larsen, 1951, plate 1).	Owened by Riverside County since 1945. Development undetermined.

Revised 10/1/61

Rock Products
Decomposed Granite
Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
127	Riverside County Pit (name un- determined)	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T2S, R6W, SBM. Along the north bluff of Santa Ana River west of Van Buren Blvd. (Pedley Rd.), 3/4 mile SE. of Pedley.	Riverside County	Weathered Cretaceous granitic rock (Bonsall Tonalite).	Pit about 1,000 feet long, 500 feet wide, maximum depth of 25 feet. Mined as a source of road metal by Riverside County since before 1930. Active.

Rock Products

Decomposed Granite

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
428	Riverside County Pit (Name unde- termined)	NE 1/4 sec. 12, T3S, R6W, SBM. 1/4 mile southwest of the intersection of Van Buren Blvd. and Challen Ave. at the northeast edge of low hills 3/4 mile northwest of Arlington.	Riverside County	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite).	Pit about 200 feet long, 50 feet wide with maximum height of face 40 feet. Apparently used as a source of road metal by Riverside County Road Dept. from 1916 until recent years. In January 1963 the area was being utilized as a dump site.

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Rock Products
Decomposed Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
427	Riverside County Gravel Pit	N $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 11, T6S, R4W, SBM. 3 miles east of Elsinore, south side of Railroad Canyon Road.	Riverside County	Weathered granodiorite (Cretaceous Woodson Mountain Granodiorite of Larsen, 1951, plate 1).	Owned by Riverside County since 1949. Development undetermined.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
43c	Riverside County Gravel Pit	SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 23, T6S, R4W, S8M. West end of Bundy Canyon, north side of Bundy Canyon Road.	Riverside County owns 85.78 acres.	Weathered granitic rock (mapped as Cretaceous San Marcos Gabbro by Larsen, 1951, plate 1).	Owned by Riverside County since 1938. Development undetermined.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
431	Riverside County Gravel Pit	N $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 8, T6S, R4W, SBM. Northeast trending ridge along the south side of Moroni Ave., $\frac{1}{4}$ mile east of Elsinore City Hall.	Riverside County	Weathered granitic and metamorphic rock (mapped as Cretaceous San Marcos Gabbro and Triassic Bedford Canyon Formation by Larsen, 1951, plate 1).	Owned by Riverside County since 1944. Development undetermined.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
432	Sugar Loaf Pit	NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 17, T2S, R4W, SBM. In the Box Springs Mtns. east of Sugarloaf Mtn. at the north end of Mt. Vernon Ave.	Joe Brennan and Sons, 1869 Service Court, Riverside.	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Mined by present operator since the late 1950's as a source of road metal and fill material. Pit is a somewhat semi-circular side-hill cut with radius about 400 ft. and maximum height of developed face about 40 ft. Standard excavating equipment is used. Small intermittent production each year, total undetermined. Active 1963.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
432	Undetermined Pit (name undetermined)	SE $\frac{1}{4}$ SW $\frac{1}{4}$, sec. 30, T4S, R4W, SBM. Just south of Santa Rosa Road.	Undetermined	Weathered blue-gray granitic rock (Cretaceous Bonsall Tonalite).	Pit 50 feet by 100 feet and 20 feet deep. Idle, but apparently active in recent years.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
434	Undetermined Pit (name undetermined)	SW $\frac{1}{4}$ sec. 2, T2S, R6W, SBM. South edge of the Jurupa Mountains, at the north end of Fleming Street	Undetermined	Decomposed Triassic(?) granitic gneiss.	Small pit 50 by 150 feet and 25 feet maximum depth. No equipment. Idle.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
135	Undetermined Pit (name undetermined)	E $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 17, T3S, R4W, SBM. Low hills east side of Elsinore Road, 3/4 mile south of Alessandro Blvd.	Undetermined	Weathered granitic rock (Cretaceous Bonsall Tonalite). Gray decomposed "granite", about one-foot of red soil overburden.	Irregular, shallow side-hill cut, about 350 ft. by 200 ft., and 10 to 15 ft. deep. For many years a source of decomposed "granite" used locally for road metal. Mined intermittently, inactive June 1963.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
136	Dit (name undetermined	SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 32, T2S, R4W, SBM. Isolated hill, south side of lower Box Springs Canyon.	Undetermined	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Side-hill cut about 150 ft. long, 10-15 ft. deep. Apparently a local source of road metal. Apparently long idle.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
137	RLE (name undetermined).	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 15, T3S, R4W, SBM. South side Alessandro Blvd., $\frac{1}{2}$ mile west of U.S. Highway 395.	U.S. Air Force	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Irregular shallow pit 10 to 15 ft. deep covers an area about 500 ft. by 350 ft. Has been mined as a source of road metal and sub base fill for March Air Force Base projects. In the early 1950's the Service Rock Co., Riverside, mined a considerable quantity of this material for housing projects at the air base. Idle in 1963.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
138	Pit (name undetermined)	SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 10, T3S, R4W, SBM. North side of Alessandro Blvd., $\frac{1}{2}$ mile west of U.S. Highway 395.	Undetermined	Weathered granitic rock (Cretaceous Bonsall Tonalite).	Side-hill cut about 300 ft. long, 150 ft. wide, and 15 feet deep. In 1942 the Service Rock Co., Riverside, mined a large tonnage of this material for use as sub base in runway construction and for road metal at March Air Force Base. Inactive in 1963, and apparently long idle.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
439	Pit (Name) undetermined	NE 1/4 sec. 36 (proj.), T3S, R6W, SBM. West side of Taylor Street, 3/4 mile north of Cajalco Dike.	Undetermined	Weathered quartz monzonite (Cre- taceous Woodson Mountain Grano- diorite).	Side hill circular cut, 75 feet in dia- meter, 25 feet deep. Apparently a local source of road metal, long idle.

Rock Product

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
140	Pit (Name undetermined)	NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 32, T2S, R5W, SBM. Southeast Corner of Mountain View and Fremont Streets, Riverside.	Undetermined. Reported to be operated by E. L. Yeager Construction Co., Riverside, and to City of Riverside.	Light gray, weathered, granitic rock (Cretaceous Bonsall Tonalite).	Area has been a local source of decomposed granite for many years. Shallow pit covers an area about 1500 feet by 500 feet. Mining has been on several irregular levels, maximum depth about 40 feet. Mining is done by bulldozer, ripper, and skip loaders. Active January, 1963.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
141	Pit (name undetermined)	NW 1/4 sec. 14, T5S, R2W, SBM. Small isolated hill, 1/4 mile west of California Ave., south of Highway 74.	Undetermined	Weathered granitic rock (Cretaceous San Marcos Gabbro).	Side hill cut on west side of hill, apparently active in 1963.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
14	Pit (name undetermined)	NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 36, T4S, R4W, SBM. 1 $\frac{1}{2}$ miles southwest of Perris, $\frac{1}{2}$ mile north of Ellis Ave.	Undetermined	Reddish-brown weathered granitic rock (Cretaceous Bonsall Tonalite).	Decomposed "granite" has been quarried from an irregular pit area about 500 feet by 300 feet and 10 feet deep. Hard, unweathered zones are left as "islands". Mining is done with a Ferguson rubber-tired tractor equipped with front-end loader and fresno. Pit apparently active, but not in operation at time of visit 7/2/63.

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Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
143	PLS (Name undetermined)	SW $\frac{1}{4}$ sec. 14, T2S, R6W, SBM. on the west side of Felspar St., $\frac{1}{4}$ mile south of Jurupa Road.	Undetermined (1963)	Weathered mica schist (Triassic? Bedford Canyon Formation) and granitic material.	Semicircular pit, 75 feet wide, 75 feet long, maximum face height 20 feet. Apparently a former source of "decomposed granite", long idle.

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Rock Products

Decomposed Granite

Riverside Co.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
444	Pit (Name undetermined)	NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 22, T2S, R6W, SBM. Low hill on the east side of Cedar Street, between 53rd and 56th Streets.	Undetermined	Weathered mine schist (Triassic ⁷ Bedford Canyon Formation) and granitic material (Cretaceous San Marcos Gabbro).	Shallow working on northwest flank of hill over an area about 150 by 200 feet and 5 feet deep. The south flank of the hill has also been mined over an area about 200 by 80 feet and 15 feet deep. Apparently a source of "decomposed granite". Idle.

100' x 100' 600'

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
745	Pit (Name undetermined)	NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 29, T3S, R5W, SBM. East side of McAllister SE.	Undetermined	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite).	Circular quarry, 100 feet in diameter, maximum height of face 15 feet. One foot of soil overburden. Intermittently active as a local source of decomposed granite. Idle in January 1963.

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Rock Product
Decomposed Granite
Riverside County

Rock Product
Decomposed Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
1146	Pit (Name undetermined)	SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 29, T3S, R5W, SBM. Along the west side of McAllister St.	Undetermined	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite?)	Narrow pit along road cut, 150 feet long, face 15 feet high. Apparently once used as a local source of road metal. Long idle.

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
447	Pit (Name undetermined)	SE $\frac{1}{4}$ sec. 25 (proj.) T3S, R6W, SBM. East side of Taylor Ave., 2 $\frac{1}{4}$ miles southeast of Magnolia Ave.	Undetermined	Weathered granitic rock (Cretaceous Woodson Mountain Granodiorite).	Shallow circular pit 100 feet in diameter, 15 feet deep. Long idle. In use as a dump in January 1963.

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Rock Products
Decomposed Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
445	Pit (Name undetermined)	NE 1/4 sec. 25 (proj.) T3S, R6W, SBM. West side of Taylor St., 2 miles south-east of Magnolia Ave.	Undetermined	Weathered granitic rock (Cretaceous) Woodson Mountain Granodiorite).	Shallow borrow pit mined by small skip loader, for use in surfacing local roads. Intermittently active.

322

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
749	Pit (name undetermined)	SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 11, T4S, R4W, SBM. Low hills north side of Cajalco Road, 1 $\frac{1}{2}$ miles west of Highway 395.	Undetermined	Weathered granitic rock (Cretaceous Bonsall Tonalite) with irregular, hard unweathered areas.	Decomposed "granite" has been removed inbetween the hard areas over an irregular area about 50 feet by 100 feet with a maximum depth of 10 feet. Inactive.

323

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
150	Pit (Name undetermined)	NW ¹ / ₄ sec. 5, T3S, R5W, SBM. Southwest corner of Arlington and Colorado Aves., Riverside.	Undetermined	Weathered (Cretaceous) Bonsall Tonalite.	Shallow pit, maximum depth 10 feet. Mined many years ago as a local source of decomposed granite. Long inactive.

324

Rock Products

Decomposed Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
451	Quarry (name undetermined)	NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 32, T4S, R4W, SBM. South side of Santa Rosa Road, 4 $\frac{1}{2}$ miles west of Perris.	Undetermined	Weathered blue-gray granitic rock (Cretaceous) Bonsall Tonalite?).	Side-hill quarry about 300 feet long, 100 feet wide, 40-foot face. Idle, but apparently has been active in recent years.

325

Dunlap Granite
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Unidentified	NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 9, T4S, R6W, SBM, northwest of El Cerrito Village and about 3 $\frac{1}{2}$ miles southeast of Corona.	Minnesota Mining and Manufacturing Company, 900 Bush Ave., St. Paul, Minnesota (P.O. Box 276, Corona)	Light brownish-gray, soft, weathered quartz monzonite with minor hard, light gray blocks.	Two small, nearly connected quarries totaling about 100 feet in length with face from 10 to 25 feet high. Mined by power shovel without blasting. Small intermittent production, probably used locally to surface roads. (Gray, 1961, p. 118).

Amphibol Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Undetermined</i> Undertified	SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 4, T5S, R6W, SBM, about 8 miles southeast of Corona on a ridge between Bixby and Anderson Canyons.	Alfred H. and Sue M. Beazley, 601 Fern Drive, Fullerton, own patented ranch land in area.	Brownish-gray, soft, weathered biotite quartz diorite. Largely altered to clay, breaks into fine-grained material.	Shallow bulldozer cut opened in 1956 in which year a small volume of material removed for local use, probably on roads. (Gray, 1961, p. 118).

327

Dimension Stone

Riverside Count.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Corona Rock Company				See Mt. Hole Quarries and Sierra Grande Quarries.
	19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100				Franklin (t)
					328

Rock Products

Dimension Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
389	Mt. Hole Quarries	Secs. 8,16,17, T3S, R6W, SBM. In the La Sierra Hills 2 to 3 miles north and northeast of Porphyry Station	Wyle Labs Norco Facility, 1841 Hillside, Norco owns the area in sec. 17 in which the best-developed quarries lie.	Light gray, medium grained, porphyritic granodiorite which weathers into huge light-colored boulders of disintegration (mapped as Mt. Hole Granodiorite by Larsen, 1951, plate 1).	In the early 1900's a number of operators including the Corona Rock Co., Lane Bros., and the Sierra Grande Quarries quarried dimension stone from large boulders of granodiorite in sec. 8,16, and 17. Products included Belgian paving blocks, monumental stone, and rock for concrete, macadam and railway ballast. Numerous split boulders attest to the widespread activity, but in only a few places were regular quarries opened. Three small side hill quarries are located in the N½ of sec. 17. The largest quarry is in the NE. corner of sec. 17 and is about 100 ft. long, 50 ft. wide, with face 40 ft. high. This is the most recently active quarry and was operated by Livingston Rock and Gravel Co., Inc. about 1956-57 as a source of rubble stone. Apparently the other quarries have been idle since about 1925. (Aubury, 1906, p. 46-47; Merrill, 1917 [1919], p. 584-585; Tucker and Sampson, 1929, p. 508; Tucker and Sampson, 1945, p. 166).

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~~Broken and Crushed Stone~~ *Quarry*

Granite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Quarry (name undetermined)	NW $\frac{1}{4}$ sec. 3, T2S, R6W, SBM North edge of the Jurupa Mountains.	Riverside County	Cretaceous Woodson Mountain Grano-diorite. Light gray, hard, fine-grained, inclusion-free grano-diorite.	Apparently quarried on a small scale at some unknown time for building purposes. In 1950 the quarry was about 50 feet long, 20 feet wide, and 15 feet high. Idle in 1950. By 1963 the quarry was nearly filled with debris and was being utilized as a Riverside County disposal area. (Mackevett, 1951, p. 13).

no. 14

Rock Products

Dimension Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
29	Rubidoux Hill Quarry	NE $\frac{1}{4}$ sec. 22 (proj.), T2S, R5W, SBM. North end of Mount Rubidoux, south side of 8th St. Not verified, 1963.	Undetermined	Pale gray Cretaceous granite. Weathered to a depth of several feet. Fine or coarse gr. <i>Medium grained.</i>	Small quarry active prior to 1905, apparently used for building stone, probably local use for foundations. Owned by Riverside Water Company in 1905. Apparently inactive since before 1905. (Aubury, 1906, p. 47).

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ROCK Products
Dimension Stone
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
592	Sierra Grande Quarries	N $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 29 (proj.), T3S, R6W, <u>North end of</u> SBM. /north-trending hill, just south of Santa Fe RR., $\frac{1}{4}$ mile east of Porphyry Station.	Undetermined	Pink, indistinctly granular, micro-pegmatite granite. Rock occurs as reddish-brown, sheet-like masses and is well jointed.	Irregular side-hill quarry about 750 feet long, face about 40 feet high. Apparently this is one of a number of quarries operated in the vicinity of Porphyry Station in the early 1900's. All quarries were idle before 1929 and except for the Jameson and Mt. Hole quarries (see herein) have apparently remained idle. Belgian paving blocks, monumental stone, and rock for concrete, macadam, and railway ballast were the chief products. In many places boulders were quarried and no particular quarry site was opened. (Aubury, 1906, p. 46-47; Merrill, 1917, <u>[1919]</u> , p. 584-585; Tucker and Sampson, 1929, p. 508; Tucker and Sampson, 1945, p. 166).

Dimension Stone
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
393	Temecula Quarries	E $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 24, T8S, R3W, SBM. 2 miles south of Temecula along the west side of Highway U.S. 395; NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 30, T8S, R2W, SBM. South side of Wolf Valley, east of Hwy. 395.	Undetermined	Unweathered large residual boulders of Cretaceous Woodson Mountain Granodiorite. Rock had a very even fracture which resulted in large, regular, smooth surfaces after being split. Fresh rock had a light gray color with a faint rose tint.	^{A quarry in sec. 24 was active in 1889 and by} By 1905 two quarries were active. One operated by Patrick Quinn was in sec. 24, and the other, operated by F. L. Fernald is reported by local residents to have been in Wolf Valley (sec. 30?). The quarries were worked by hand and most of the stone was quarried from boulders. Products included Belgian paving blocks, curbing, flagging, and fence posts. Some of these stone blocks are still in use (in 1963) at Temecula. The quarries were still active in 1915 and were operated by M. Machado and Joseph Winkles. By 1929 the quarries were idle and have since remained idle. ^{Goodyear, 1890, p. 147;} (Aubury, 1906, p. 42-43, 47; Merrill, 1917 [1919], p. 586; Tucker and Sampson, 1929, p. 509; Tucker and Sampson, 1945, p. 166; Mann, 1955, p. 19, plate 1).

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Granite Division Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>(In section 2)</i> Unidentified quarry	SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 32, T4S, R4W, SBM, on the west side of a low knoll (see fig- ure 42).	Undetermined	Gray, moderately coarse grained "Perris Quartz Diorite" (Dudley, 1935, p. 501)	Developed through an open cut. Stone appears to have been cut here but tonnage yielded not determined.

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-Granite Dimension Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Unidentified quarry	NW $\frac{1}{4}$ sec. 17, T5S, R4W, SBM, Arroyo del Toro area about 4 miles north of Elsinore.	Undetermined		Quarry, (Dudley, 1935, p. 506; Engel, 1959, p. 100, 136).

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Granite Dimension Stone
Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>not named</i> Unidentified quarry	SE $\frac{1}{4}$ sec. 18, T5S, R4W, SBM, Arroyo del Toro area, about 3 - 3/4 miles north of Elsinore.	Undetermined.		Quarry, (Dudley, 1935, p. 506; Engel, 1959, p. 100, 136).

Granite Dimension Stone

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>Unidentified</i> Unidentified quarry	SW $\frac{1}{4}$ sec. 18, T5S, R4W, SBM, Arroyo del Toro area, about 3 $\frac{1}{2}$ miles north of Elsinore	Undetermined		Quarry, (Dudley, 1935, p. 506; Engel, 1959, p. 100, 136).

3317

Stone - Slate

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
1	Rainbow Slate group)	T5S, R4W, SBM.	Rainbow Mining and Mineral Products Co.		"Three miles north of Elsinore". Probably in area of slate outcrops in Railroad Canyon. Dark, red, yellow, and brown slates in beds 6 to 8 ft. thick quarried prior to 1929 and ground in a 20-ton capacity plant for roofing purposes. Production undetermined. (Tucker 1929, p. 524; Engel, 1959, p. 138)

338

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Riverside Quarries Company deposit	Sec. 24(?), T5S, R4W, SBM, about 4 miles south of Perris.			Reported explored through open cut 200 ft. long 15 ft. wide and 12 ft. deep. (Tucker, 1929, p. 524; Engel, 1959, p. 103).

339

Slate

Riverside Coun.

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Wrench Slate prospect	S $\frac{1}{2}$ sec. 34, T5S, R4W, SBM.	J. H. Wrench, Elsinore (1937)	Fissile slate strikes N. 60°W. and dips 65° NE.	See Wrench prospect under gold. About 200 ft. east of the gold prospect, an open pit with face 20 ft. long and 5 ft. high. Curvature of slaty cleavage planes abundant cross fractures, and tendency of slate to fray on weathered edges limit commercial possibilities. (Engel, 1959, p. 138).

340

Slate

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Unidentified state quarry	S $\frac{1}{2}$ sec. 23, T5S, R4W, SBM, west side of Railroad Canyon, about $\frac{1}{4}$ mi. from stream, about 4 mi. NE. Elsinore.	Undetermined		Quarry, (Dudley, 1935, p. 494; Larsen, 1948, p. 129; 1951, p. 45; Engel, 1959, p. 138).

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State

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	<i>1945-1946</i> Unidentified state quarry	N $\frac{1}{2}$ sec. 26, T5S, R4W, SBM, west side of Railroad Canyon, about $\frac{1}{4}$ mi. from stream, about 4 mi. NE. Elsinore.	Undetermined		Quarry, (Dudley, 1935, p. 494; Larsen, 1948, p. 129; 1951, p. 45; Engel, 1959, p. 138).

342

Sodium Sulphate

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Bloom (claim)	Secs. 15, 21, T7S, R13E, SBM.	Undetermined	This material is probably of an age and origin similar to that mined at the Bertram deposit a few miles to the southwest near the Salton Sea in Imperial County. See the following references (Tucker, 1924, p. 87-91; 1926, p. 281-283; Sampson, 1942, p. 140-143).	(Tucker, 1945, pl. 35).
	See I, B1 & T11				<u>T11</u> See South Black Rock (t) 343

Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME; ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Beauty Mountain claim	Sec. 36, T8S, R2E, SBM.	Undetermined		(Tucker, 1945, pl. 35).
					344

Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
1	Blue Bird and Eagle claims	Sec. 29, T3S, R1E, SBM.	Undetermined		(Tucker, 1945, pl. 35).

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Riverside County

346

Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Dumbbell #1 and #2; G. S. #3, #4, #5 (claims)	Sec. 18, T7S, R5E, SBM, on north slope of Santa Rosa Mtns.	Gerhardt A. Steffen, 3603 Helms Ave., Culver City (1958)	Probably tactite in igneous-metamorphic rocks.	(Personal communication, A. S. Gerhardt, July 31, 1958).

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Tungster

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Magnesium Canyon Tungsten (mine) (Cottonwood #1 - #3)	Sec. 22, T5S, R5E, SBM, 15 miles west of Indio.	Mr. and Mrs. Milton L. Knapp, P.O. Box 365, Arlington (1958) Under lease and option to T. J. Young, Los Angeles 1941-1943	A zone of scheelite-bearing quartz, epidote, garnet tactite bodies in igneous-metamorphic rocks. Tactite bodies 3 to 60 ft. in thickness and 100 to 300 ft. in exposed lateral extent. Assays report 0.8 to 1.5 percent WO_3 .	Developed by 7 trenches and a 25-ft. shaft (Tucker, 1941, p. 582-583; 1945, p. 155, pl. 35).

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Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Matilda group,	Sec. 28(?), T7S, R15E (proj.) SBM, on southwest slope of Chuckwalla Mts.	E. G. Sweeney, 355 Norton St., Long Beach (1945)	Scheelite in quartz-epidote-garnet zones at and near contact of diorite dikes and schist.	Extent of development not determined; shipments, reported made to Metal Reserve Company's stockpile at Parker, Ariz. said to average 2 percent + WO ₃ . (Tucker, 1945, p. 155-156, pl. 35).

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Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Miller Ranch	Sec. 2, T8S, R6E, SBM, 24 mi. south-west of Indio.	George A. Glover, Box 1187, Palm Springs (1955).	Tactite-bearing carbonate in igneous-metamorphic rocks. Reported to assay 1 percent WO_3 in ore body 2 to 7 feet wide.	Developed through 56-ft. adit and 20-ft. shaft. (Tucker, 1941, p. 583; 1945, p. 156, pl. 35).
	<i>Oak Grove</i>				<i>(See Fairview mine (L))</i>

352

Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Phoenix Tungsten (Maynard) prospects	Sec. 9, T5S, R4E., SBM, approx. 7 miles southeast Palm Springs.	Andreas Canyon Club Inc., Palm Springs, 640 acres pat'd. land (1945)	Scheelite-bearing tactite in metamorphosed carbonate rocks in ridge between Andreas and Murray Canyons. Zones as much as 18 feet wide form about eight bodies exposed through horizontal distance of about 900 feet.	Developed through open cut. (Tucker, 1945, p. 156-157, pl. 35).

353

Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Pigeon Creek Tungsten (mine)	Sec. 11, T7S, R5E, SBM, $\frac{1}{2}$ mile south of Pinion Flat.	Jack Harris and Associates, Los Angeles (1945)	Scheelite in tactite at granite-limestone contact in zone 10 to 20 ft. wide.	Developed through open cut. (Tucker, 1945, p. 157, pl. 35).

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Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Ribbonwood Tungsten, Inc. claims)	Sec. 26, T7S, R5E, SBM, northeast slope Santa Rosa Mts.	Ray Galenor and George Stallman, Walter P. Story Bldg., Los Angeles (1945)	Scheelite in garnet-epidote-quartz tactite along granite-schist contacts. Some ore reported 2 percent + WO ₃ .	Developed through 40-ft. adit. Few tons of ore shipped to Parker stockpile. (Tucker, 1945, p. 157-58, pl. 35).

355

Vermiculite

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
	Asbestos King (claim)	About 15 miles southeast of Indio.	Undetermined		(Wright, 1950, p. 184; 1957, p. 359; Murdoch, 1959, p. 29).

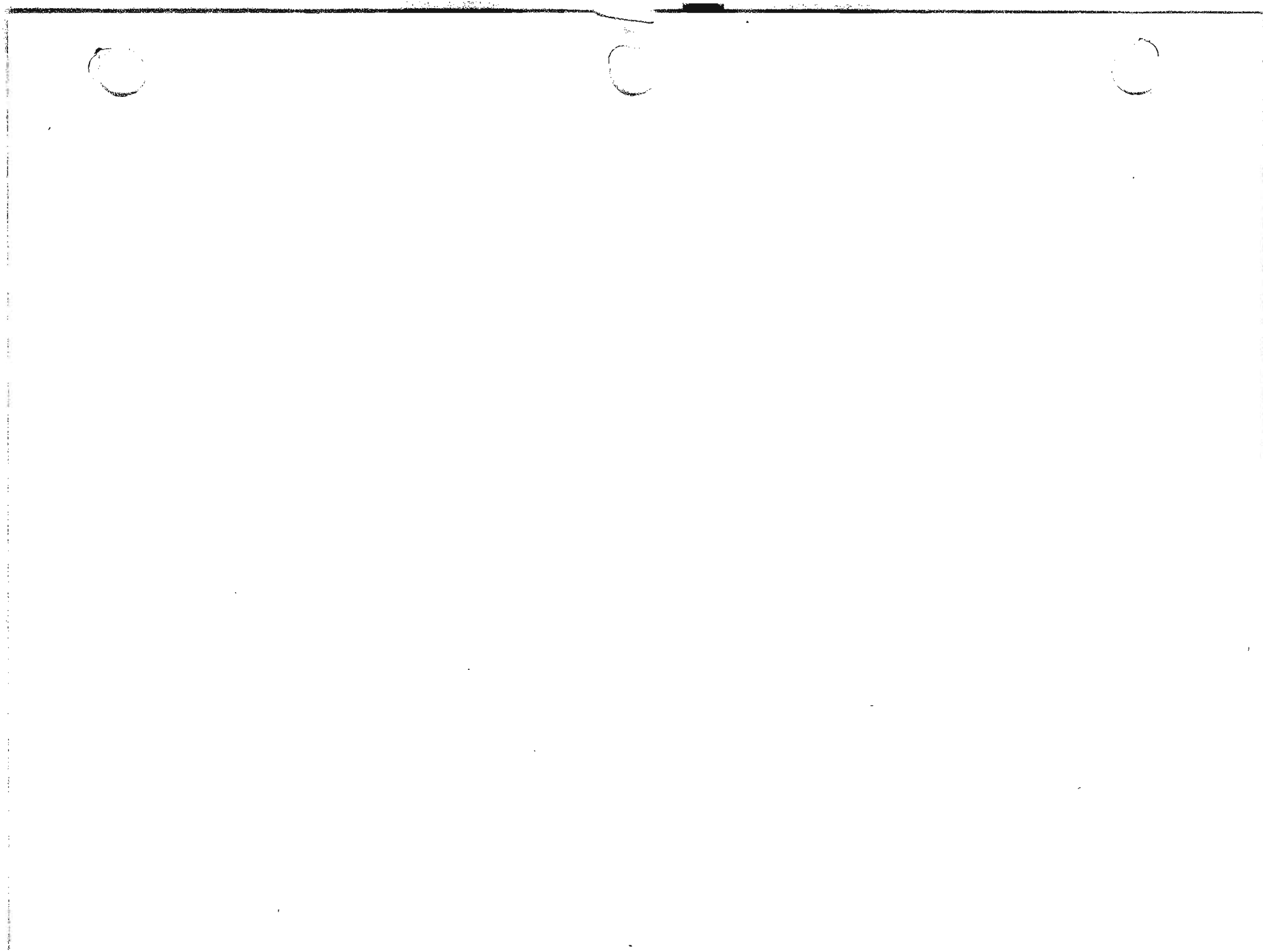
356

Pod 357

Missing

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Tungsten

Riverside County

MAP NO.	NAME OF CLAIM, MINE, OR GROUP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
50:	Good Fairy	SW $\frac{1}{4}$ sec. 10 (proj.), NW $\frac{1}{4}$ sec. 15 (proj.), T8S, R17E, SBM, on the north slope of Chuckwalla Mtns. about 1 mile north- northeast of Chuck- walla Spring.	Undetermined	A shear zone as much as 12 feet wide in gneissic diorite strikes N. to N.15°E., dips 65°E.; is exposed through about 500 feet. A quartz vein 3 to 8 feet thick lies along footwall. Vein fractured and stained by secondary iron minerals, resembles gold ore of nearby mines. Local claim holder (Ben I. Brewer) identified this as a tungsten prospect. Presence of tungsten minerals not verified.	Shear zone explored through 4 shallow prospect pits.

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NAME MINE, 4	AIM, UP	LOCATION	OWNER (NAME, ADDRESS)	GEOLOGY	REMARKS AND REFERENCES
Indian Tungsten mine		Sec. 28, T7S, R5E, SBM, 6 miles south of Pinon Flat.	Elmer E. Dunn, Pinyon Flat (1945)	Scheelite in garnet-epidote tactite body 60 feet wide and 600 feet in length.	Developed by 150-foot crosscut adit. (Tucker 1945, p. 155, pl. 35).

TN
24
C2 A33
100-36

Palen Pass

Gravel

Packard

Gravel

Gravel

Gravel

Gravel

Gravel

Gravel

EXPLANATION

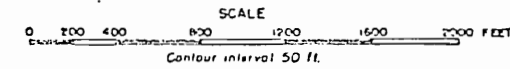
- JURASSIC (?)**
- Jump Porphyroblastic phase of meta-igneous rock
 - Jmi Meta-igneous rock albite-quartz-biotite schist; commonly endotitic; highly feldspathized and recrystallized locally
- TRIASSIC (?)**
- Tm McCoy Mountains (?) formation; conglomerate, argillite, phyllite, grit, quartz porphyry
- UPPER PALEOZOIC (?)**
- Psm Line silicate marble
 - Pim Laminated marble and siliceous marble
 - Pqt Quartzite
 - Pm Marble
 - Pg Gypsum
 - Psc Green schist, grit, & quartzite; locally gypsiferous
 - mmn* Meta-igneous and Maria formation
 - mc Maria formation, highly deformed complex
- Maria formation**
- Undifferentiated**

- Contact, showing dip; dashed where approximately located or gradational; dotted where concealed
- Contact, very uncertain
- Fault, showing dip; dashed where approximately located
- Concealed fault
- Doubtful or probable fault; dotted where concealed
- Fault, showing bearing and plunge of grooves, striations, or slickensides
- High angle fault; U, upthrown side, D, downthrown side
- Fault, showing relative movement
- Thrust or low angle reverse fault; T, upper plate
- Anticline, showing trace of axial plane and bearing and plunge of axis
- Overturned anticline, showing trace of axial plane, direction of dip of limbs, and bearing and plunge of axis
- Plunge of minor anticline
- Plunge of minor syncline
- Strike and dip of beds
- Horizontal beds
- Strike and dip of foliation
- Strike of vertical foliation
- Small prospect pit
- Slide

GEOLOGIC MAP OF THE PALEN MOUNTAINS GYPSUM DEPOSIT

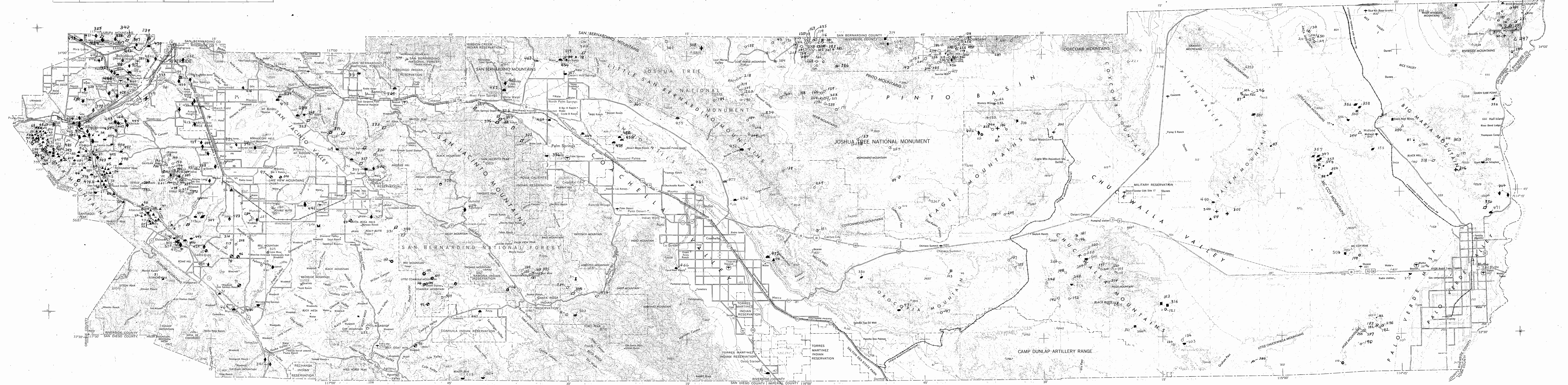
RIVERSIDE COUNTY, CALIFORNIA

by Richard A. Hoppin, 1950



Base from aerial photographs

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By R.B.Saul, C.H.Gray, J.R.Evans, Geologists
California Division of Mines and Geology

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